DRAFT REPORT

Central Freeway

AREAWIDE TRAFFIC STUDY

prepared for

SAN FRANCISCO DPT DEPARTMENT OF PARKING & TRAFFIC

DEPARTMENT OF PARKING AND TRAFFIC
CITY AND COUNTY OF SAN FRANCISCO

by
WILBUR SMITH ASSOCIATES
in association with
CCS Planning and Engineering, Inc.
Pittman & Hames Associates
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August 15, 1994

Mr. Gerald Robbins, Transportation Planner
City and County of San Francisco
Department of Parking and Traffic
25 Van Ness Avenue, Suite 345
San Francisco, CA 94102

Dear Mr. Robbins:

Wilbur Smith Associates is pleased to submit the Central Freeway Areawide Traffic Study Draft Final Report for technical, public and policy review. The report describes existing traffic problems and a number of alternative Central Freeway concepts. A series of complementary transportation improvement opportunities is also identified.

The key issue addressed by this report is whether there are viable and desirable circulation options to the seismic retrofit. Our analysis indicates alternatives to the retrofit proposal that are more supportive of livability and transportation objectives appear to be viable and merit further consideration by the City and Caltrans. Time is critical, however, to provide a safer structure as well as relieve negative impacts on the Hayes Valley/Western Addition community.

The WSA Consultant Team has greatly appreciated the contributions of the Department of Parking and Traffic to this study along with that of Caltrans, other City departments and the Hayes Valley/Western Addition Task Force. We are hopeful that continuation of this team approach will lead to a successful Central Freeway solution.

Very truly yours,

WILBUR SMITH ASSOCIATES

Peter C. Martin, P.E.
Senior Transportation Engineer

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INTRODUCTION

The Central Freeway Areawide Traffic Study was initiated by the City of San Francisco with the financial support and cooperation of the State. It is intended to provide the City and State with recommendations on how to manage traffic and transportation in the Central Freeway corridor.

The Central Freeway was constructed in 1959 as part of an overall freeway network planned for the City, much of which was never built. The Central Freeway connects with I-80 to the east, providing direct access to the East Bay via the Bay Bridge, and connects with Highway 101 south to San Francisco International Airport and San Jose. It was originally intended to run north to the Golden Gate Bridge and to the Panhandle Freeway west to Golden Gate Park. However, citizen opposition halted those projects and the freeway terminated just west of the Civic Center area with ramps to and from Franklin, Gough, Oak and Fell Streets.

Traffic circulation in the city changed significantly following the 1989 Loma Prieta earthquake. With the removal of the US 101 ramps between Fell/Oak Streets and Franklin/Gough Streets, traffic patterns were altered, causing significant impacts on arterials and key intersections which did not previously carry high volumes of through traffic. Traffic has increased substantially on streets that serve the remaining sections of the freeway.

At the same time two-way traffic on the Central Freeway between I-80 and the Mission Street/South Van Ness Avenue exit decreased by 16 percent from an ADT of 159,000 to 136,000. Similarly, the two-way volume on the segment between Mission Street and the Oak/Fell ramps has decreased by 34 percent, from an ADT of 143,000 to 94,000.

All traffic (94,000 ADT) north of Mission Street on the freeway now enters and exits at a single interchange (Oak/Fell), rather than being dispersed at two interchanges as it was before the earthquake. The Oak/Fell ramps have experienced an average 54 percent traffic increase.

Traffic that diverted from the Central Freeway has apparently been redistributed onto a number of routes:

- Van Ness Avenue;
- Oak and Fell Streets;
- South of Market freeway access streets; and
- Nineteenth Avenue-Park Presidio (State Route 1).

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The negative impact of the redistributed traffic on traffic flow and neighborhood livability prompted the City to determine alternatives to the current situation.

COMMUNITY INVOLVEMENT PROCESS

Alternative concepts for the Central Freeway were developed with extensive community input. The public participation process consisted of a series of neighborhood-based task force meetings, community-wide meetings, and technical advisory committee meetings over a seven month period.

The Hayes Valley/Western Addition Task Force, created by Board of Supervisors Resolution No. 541-92, consists primarily of residents and merchants from Hayes Valley and the Western Addition, but also includes several South of Market residents and representatives of San Francisco Beautiful, San Francisco Tomorrow and the American Institute of Architects. The Task Force is currently requesting that the Board of Supervisors expand its membership to include urban design professionals and representatives from other affected neighborhoods.

The Department of Parking and Traffic sponsored seven task force meetings between February and July, 1994. These meetings were "hands-on" technical sessions with the consultant team, members of the public, and representatives from various City Departments and Caltrans. In accordance with Resolution No. 9-94, the Task Force worked diligently to address local traffic and land use concerns, and to develop alternative recommendations concerning the Central Freeway retrofit project.

In addition to Task Force meetings, three community workshops were conducted on February 22, June 15, and July 13, 1994. The June 15th and July 13th workshops received the broadest community response. Each meeting had over 100 participants, representing over 25 citywide and neighborhood organizations. The majority of speakers at these meetings did not support retrofit of the existing freeway structure, with most favoring ending the freeway South of Market Street. The expansion of transit service also received strong support as a solution to any freeway demolition or retrofit project. Several participants also voiced concern about equitable distribution of traffic throughout all City neighborhoods, and improving existing traffic flows within the Central Freeway corridor. Several people expressed concern about traffic conditions if the Central Freeway were to be demolished.

At their July 6, 1994 meeting, the Task Force unanimously voiced support that the City reject Caltrans' proposed retrofit of the Central Freeway. The Task Force also supported the position that feasible alternatives to the retrofit have been developed in this study which should be further evaluated based on land use, neighborhood integration, and environmental concerns.

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EVALUATION OF ALTERNATIVE FREEWAY CONCEPTS

The most immediate and basic Central Freeway decision is whether or not to proceed with Caltrans' proposal to retrofit the existing freeway structure. The current retrofit proposal would bring the Mission-Fell/Oak section of the freeway up to new seismic safety criteria, which were developed by Caltrans with advice from the California Earthquake Advisory Board. The current retrofit project would go beyond mere repair by strengthening the existing viaducts up to the current seismic design criteria, thereby providing a much higher resistance to future earthquakes than a simple repair of damaged columns. The strengthening would prevent collapse and significantly reduce major damage to keep these structures in service in the event of a maximum credible earthquake.

The retrofit would fix the northern terminus at Oak/Fell Streets and would retain the present high double deck crossing of Market Street. Some minor (as yet undefined) surface street circulation and operational changes might be possible, but the retrofit proposal would limit major opportunities for change. The retrofit concept, therefore, represents a baseline alternative and provides a useful benchmark for comparing other freeway access alternatives.

Other alternatives were identified from previous City and Caltrans planning studies, from field review of the corridor and by review of proposals developed by the Hayes Valley/Western Addition Task Force and also by individuals. The full range of more than two dozen alternative concepts was narrowed to six concepts for more detailed assessment by this project. Prior concepts have not necessarily been eliminated from future consideration. The purpose of narrowing the number of alternatives in this study was to provide preliminary findings in time for the City to decide whether or not to support continued Caltrans efforts to retrofit the Central Freeway or to quickly alter this course and pursue other promising options.

The six representative freeway strategies are as follows:

A. Structural retrofit of the present double deck freeway representing status quo;

B. A minor modification of this retrofit concept eliminating the traffic conflict at Laguna and Fell Streets by diverting Gough Street on-ramp traffic via Oak Street;

C. An interim construction period/possible long range concept which terminates the Central Freeway at Mission Street;

D. A low single deck crossing of Market Street underpassing Haight Street and terminating at Oak Street;

E. A variation of the above single deck crossing concept which closes Haight Street; and

F. A south of Market Street, Mission Street terminus concept which directly routes some Highway 101 exit traffic via a new Twelfth Street exit to South Van Ness Avenue.

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Review of objectives developed by the City, the Task Force and the Study's Technical Advisory Committee, led to the development of the set of criteria, shown below, which were used to evaluate the alternatives:

Visual Impacts: How massive is the freeway structure? Is there opportunity to improve the freeway's appearance? What is the impact on views up and down Market Street?

New Right-of-Way: Would new right-of-way need to be acquired?

Developable Land: How much land currently reserved as transportation right-of-way could be freed-up for other uses?

Neighborhood Impacts: What are the impacts on the living and pedestrian environment on neighborhoods north and south of Market?

MUNI Impacts: What impacts would the alternative have on MUNI bus and light rail service in terms of improvement or degradation of traffic flow or required realignment of routes?

Traffic Congestion: How many key intersections would operate at levels of service E and F (very congested conditions)?

Traffic Crossing Market At-Grade: How much traffic would cross Market Street on the surface, thereby creating potential congestion.

Design Safety: What compromises (if any) in Caltrans design standards might have to be made to build the alternative? What is likely to be the overall impact on traffic safety resulting from the alternative?

Construction Impacts: How will traffic flow and neighborhood livability be impacted during the construction period?

Estimated Completion Date: How long is it likely to take for completion of the alternative, considering the environmental, design and construction processes?

Cost: What is the estimated cost to construct the alternative? About $30 million dollars remains of Emergency Relief Funds for use on the Central Freeway.

Table A summarizes key aspects of the six alternatives evaluated. It indicates that the single deck Market Street crossing concepts provide similar level of service conditions as the retrofit project and therefore represent viable alternatives to the retrofit project. South of Market alternatives would provide the greatest livability benefits to the Central Freeway corridor north of Market Street, however, undesirable impacts would be shifted to other areas.

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Table A
COMPARISON OF ALTERNATIVES EVALUATION MATRIX
San Francisco Central Freeway Areawide Traffic Study

Criteria	A Retrofit	B Modified Retrofit	C Mission Terminus	D Single Deck Haight St. Bridge	E Single Deck Haight St. Closure	F 12th Street Exit
Visual Impacts	status quo	very minor	3,000 feet of structure removed	• Octavia Blvd. • Lower single deck crossing Market Street	• Octavia Blvd. • Lower Structure • Single deck crossing Market Street	• 3,000 ft structure/barrier removed-Octavia • new 12th Street ramp • intersection grade separations
New Right-of-Way	none	none	none	Possible	possible	1.2 acres [1]
Developable Land	none	none	8.8 acres	3.1 acres	2.6 acres	8.8 acres
Neighborhood Impacts:						
North of Market	status quo	one block Oak St.	barrier removal	Octavia traffic	Octavia traffic	barrier removal
South of Market	status quo	status quo	traffic increase	status quo	status quo	12th Street traffic
Market Street	status quo	status quo	congestion	lower-wider barrier	lower-wider barrier	congestion
MUNI Impact	none	minor (16X)	numerous	Haight buses	Haight buses	numerous
Traffic Congestion (Level of Service)	7E and 1F	6E and 1F	6E and 10F	6E and 2F	6E and 2F	6E and 8F
At-Grade Traffic Cross Market (Pk Hr)	10,800 cars	10,800 cars	19,100 cars	9,500 cars	9,500 cars	19,100 cars
Stacking Capacity[2]	950 cars	960 cars	840 cars	960 cars	960 cars	720 cars
Construction Impacts	moderate	minor	minor	4 years	3 years	5 years
Staging	simple	simple	none	interim terminus	interim terminus	2-3 years for intersections
Estimated Completion Date	2-5 years	3-5 years	4 years	6-10 years	5-8 years	7-12 years
Construction Cost (millions): Freeway	$45-50	$50-65	$10-15	$70-90	$55-70	$30-35
Complementary Projects	--	--	$1	$1	$1	$30
Total Cost	$45-50	$50-65	$10-15	$70-90	$55-70	$60-65

[1] Brady Street and south end of 12th Street.
[2] Average of northbound and southbound.

CONCLUSIONS AND RECOMMENDATIONS

The primary issues requiring resolution in this study are as follows:

1. Should Caltrans proceed with seismic retrofit of the current double-deck Central Freeway structure over Market Street?

2. If it is decided to retrofit, what street and highway improvements should be made to make the system operate more efficiently and safely?

3. If the retrofit is not recommended, what alternative or alternatives should be considered?

4. What steps should be taken to reach and implement the best solution as quickly as possible?

Each of these questions is addressed below.

Should Caltrans proceed with Retrofit of the Existing Structure?

Retrofitting the existing structure has two primary advantages:

1. It could be accomplished in the least possible time, giving the travelling public a seismically safe facility sooner than any of the other options because it is funded, might not require an environmental impact statement, and its design is almost complete.

2. Most peak period traffic could probably be maintained during construction, thereby reducing the inconvenience of major traffic congestion problems during the construction period.

However, the retrofit also has some major disadvantages:

1. It perpetuates a structure that was designed as part of a much more extensive freeway system and consequently is a larger and higher structure than it needs to be.

2. The pre-Loma Prieta section directed traffic to both north-south and east-west corridors, thereby pointing traffic in the direction it wanted to go. The current truncated section directs all traffic east-west, thereby increasing traffic on Oak and Fell Streets to undesirable levels.

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3. One main reason to retrofit, the ability to maintain traffic continuously, is a mixed blessing. It makes the construction process very complex and puts a high degree of responsibility on Caltrans to maintain safety during the construction process.

4. The present structure has a blighting impact on adjacent neighborhoods and blocks views. The retrofit concept retains this unattractive structure.

5. A new structural design developed from recent earthquake experience would almost certainly be safer than a "patched" design.

In short, the retrofit retains an unattractive structure with unsatisfactory local traffic connections, and puts a heavy burden on Caltrans to maintain traffic safely during construction. Its retention ensures that the currently unsatisfactory urban environment in the vicinity of the structure will be perpetuated. These are significant arguments against the retrofit project and there appear to be viable alternatives. As such, it is recommended that the City and Caltrans pursue non-retrofit alternatives to define a community supportable project. If a consensus plan cannot be found, then retrofit plans should be considered.

Traffic Changes if the Retrofit Proceeds

As noted above, the retrofit is not recommended. However, if the retrofit is supported, traffic changes to the current Fell-Oak ramps documented in this report should be further explored to improve traffic flow in the area.

Alternatives to the Retrofit

It is virtually certain that any alternative to the retrofit will have to go through an extensive environmental review process which would involve consideration of a number of alternatives. Therefore, it is not necessary to choose a particular alternative at this time. However, based on the analyses of this study, it may be possible to further focus planning on alternatives that should be considered. We recommend the following:

1. **Alternatives should concentrate on those that rebuild the freeway on a single deck crossing of Market Street.** Alternatives in this category would include the "San Francisco Tomorrow" plan, referred to in Board of Supervisors Resolution 541.92. Alternatives that do not rebuild the freeway north of Market Street will lead to congestion crossing and along Market Street, thereby hampering mobility of both automobiles and transit

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vehicles. However, at least one alternative terminating the freeway south of Market Street should be examined.

2. **Alternatives should provide good traffic flow onto the Franklin/Gough/Van Ness corridor.** Traffic wishing to go to and from the north should not be routed via the Oak and Fell couplet. Rather, it should be routed via new ramps and street configurations in the least circuitous and disruptive way toward the major north-south streets in the corridor.

3. **Tunnel alternatives could probably be eliminated.** The presence of the MUNI tunnel does not appear to allow enough clearance to permit a shallow tunnel on any of the streets crossing Market. A deep tunnel would be very expensive, have unsatisfactory geometry and would not come to surface far enough south to provide the required traffic service.

Steps Required to Reach a Consensus

The following general process is recommended so that a project having the widest support can be defined, funded and constructed as soon as possible:

1. The City should recommend to Caltrans that the current freeway retrofit design process be put in abeyance at this time and that other options be studied.

2. A detailed study of alternatives should be initiated as soon as possible. This could occur through either the Caltrans Project Study Report (PSR) process or go directly to a full environmental impact statement. Whatever the process, it is critical that the study be much more than a traffic and engineering study and that all issues critical for selection of a preferred alternative be analyzed in detail.

3. The above study should have active community participation, with the Hayes Valley/Western Addition Task Force as a primary participant. Expansion of the current Hayes Valley/Western Addition Task Force to include more representation from various city neighborhoods is recommended and has already been endorsed by the Task Force.

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Interim and Supportive Traffic Improvements

A number of traffic operations and complementary freeway circulation measures appear to promise effective traffic improvements and merit further technical studies and broader public review. Improvement measures include:

Freeway Access Grade Separations

- Construct a southbound South Van Ness Avenue underpass of Mission Street;
- Add a third lane to the Mission Street off-ramp;
- Depress Thirteenth Street under South Van Ness Avenue; and
- Construct an Eighth Street off-ramp flyover of Harrison Street.

Freeway Access Operational Measures

- Extend the Howard/Folsom Street one-way couplet south to Fourteenth Street;
- Add a second lane to the South Van Ness Avenue/Mission Street on-ramp;
- Extend Franklin Street to Otis Street;
- Physically separate South Van Ness Avenue on-ramp traffic flow from westbound Howard Street traffic flow at the South Van Ness/Howard/Thirteenth Street intersection; and
- Close McCoppin Street at the Otis/Gough Street intersection and signalize the remaining Otis and Gough approaches.

Minor Improvement Measures

- Upgrade traffic, parking, loading controls as well as informational signage and signalization along freeway access routes;
- Add eastbound right-turn lane on Thirteenth Street for eastbound approach to South Van Ness Avenue;
- Modify left-turn provisions on Thirteenth Street;
- Add right- and left-turn lanes on South Van Ness Avenue southbound approach to Mission Street; and
- Explore urban design and landscaping improvement beneath the present structure.

Public Transit

- Fully fund MUNI service;
- Dispatch Route 47 buses to fill in gaps on MUNI Van Ness Avenue service;
- Develop Construction Period bus/HOV lane plan; and
- Study Nineteenth Avenue corridor regional bus service.

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1. INTRODUCTION

The Central Freeway Areawide Traffic Study has two separate but related purposes and components:

1. To develop and analyze alternative proposals for the Central Freeway and its related traffic network; and

2. To develop improved traffic signal timing in the Van Ness Avenue/Lombard Street corridor.

The majority of the work effort focussed on the first component because of the complexity, public interest and urgency of that effort. The California Department of Transportation (Caltrans) is in the process of designing a seismic retrofit for the Freeway and it obviously is important that recommendations of this Central Freeway Areawide Traffic Study be made prior to the onset of seismic retrofit construction. Fast-tracking this decision is important not just to save planning/design monies, to expedite potential livability benefits to nearby neighborhoods and to benefit motorists, but also to minimize the time that the seismically unstrengthened freeway is at risk from another earthquake.

This is a transportation planning study to provide decision making information to the City and County of San Francisco regarding a course of action for the Central Freeway. It preliminarily addresses environmental, land use planning and design analyses but not in a detailed level of analysis that will be required in subsequent phases. The key issue is whether the retrofit proposal should be pursued or whether other circulation concepts merit consideration by the City and Caltrans.

STUDY BACKGROUND AND PLANNING CONTEXT

San Francisco's Central Freeway (Figure 1-1) was constructed in 1959 as part of an overall freeway network planned for the City, much of which was never built. The Central Freeway connects with I-80 to the east, providing direct access to the East Bay via the Bay Bridge, and connects with Highway 101 south to San Francisco International Airport and San Jose. The Central Freeway was intended to run north to the Golden Gate Bridge and to the Panhandle Freeway to the west to Golden Gate Park, but considerable citizen opposition halted those projects and the freeway terminated just west of the Civic Center area with ramps to and from Franklin, Gough, Oak and Fell Streets.

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Figure 1-1
CENTRAL FREEWAY

WSA WILBUR SMITH ASSOCIATES

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Prior to the 1989 Loma Prieta Earthquake, the Central Freeway carried over 140,000 vehicles per day between Mission/South Van Ness and the Oak/Fell and Franklin/Gough ramps. Traffic was distributed among four ramps and six major City streets, making traffic operations more efficient than the existing two ramp, two major street system. The ramp connections at Franklin/Golden Gate and Gough/Turk Streets served as principal access/egress points for traffic to and from the north (Marin County and the Marina District), the East Bay (via I-80) and the Peninsula (via US 101 and I-280). The Franklin/Gough ramps combined carried more than 80,000 vehicles per day prior to the earthquake.

As most citizens and drivers in San Francisco can attest, traffic circulation in the city has changed significantly following the 1989 Loma Prieta earthquake. With the collapse and subsequent removal of the US 101 ramps between Fell/Oak Streets and Franklin/Gough Streets, traffic patterns between the Marina and the South Van Ness areas have become widely dispersed, causing significant impacts on arterials and key intersections which did not previously carry high volumes of through traffic (see Chapter 2).

The Franklin/Gough Central Freeway ramps were demolished in late 1991/early 1992. Following public hearings on freeway replacement, the Board of Supervisors approved resolution 541-92 in July of 1992, which makes it the City's policy "not to build any new above-ground ramps to replace the demolished sections of the Central Freeway". In September, 1992 the City requested funding for the Central Freeway Areawide Traffic Study from Caltrans and the Federal Highway Administration (FHWA). Study funding was approved by the FHWA in February 1993 and the study was commissioned by the City in November 1993.

The current study was initiated by the City with the financial support and cooperation of the State. It is intended to provide the City and the State with recommendations on how to manage traffic and transportation in the Central Freeway corridor.

COMMUNITY AND TECHNICAL PROCESS

Alternative concepts for the Central Freeway were developed with extensive community input. The public participation process consisted of a series of neighborhood based task force meetings, community-wide meetings, and technical advisory committee meetings over a seven month period.

Task Force

The community participation process was launched in January 1994 with the Board of Supervisors' appointment of a 16-member community Task Force. The Hayes Valley/Western Addition Task

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Force, created by Board of Supervisors Resolution No. 541-92, consists primarily of residents and merchants from Hayes Valley and the Western Addition, but also includes several South of Market residents and representatives of San Francisco Beautiful, San Francisco Tomorrow and the American Institute of Architects. Appendix B lists the names of the Task Force members. (The Task Force is currently requesting that the Board of Supervisors expand its membership to include urban design professionals and representatives from other affected neighborhoods.)

The Department of Parking and Traffic sponsored seven task force meetings between February and July, 1994. These meetings were "hands-on" technical sessions with the consultant team, members of the public, and representatives from various city departments and Caltrans. In accordance with Resolution No. 9-94, the Task Force worked diligently to address local traffic and land use concerns, and to develop alternative recommendations concerning the Central Freeway retrofit project.

Community Workshops

In addition to Task Force meetings, three community workshops were conducted on February 22, June 15, and July 13, 1994. About 50 people attended the first workshop on February 22nd. After hearing an overview of the study schedule and process, participants at the February workshop identified traffic, circulation and land use issues, and suggested several alternatives to the retrofit project.

The June 15th and July 13th workshops received the broadest community response. Each meeting had over 100 participants, representing over 25 citywide and neighborhood organizations. After hearing presentations by the consultant team, Task Force and Caltrans, community representatives discussed traffic concerns, freeway alternatives, and the proposed Caltrans retrofit project. The majority of speakers did not support retrofit of the existing freeway structure, with most favoring ending the freeway South of Market Street. The expansion of transit service also received strong support as a solution to any freeway demolition or retrofit project. Several participants also voiced concern about equitable distribution of traffic throughout all City neighborhoods, and improving existing traffic flows within the Central Freeway corridor. Several people expressed concern about traffic conditions if the Central Freeway is demolished.

Technical Advisory Committee

In conjunction with the Task Force meetings and community workshops, a Technical Advisory Committee (TAC) comprised of representatives of public agencies participated in the study. The TAC included representatives from the Department of Parking and Traffic (DPT), the Municipal Railway (MUNI) the Department of City Planning (DCP), the San Francisco County Transportation

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Authority, the Department of Public Works, the Mayor's Office and Caltrans. Appendix C lists the names of the Technical Advisory Committee.

Task Force Recommendation

At their July 6, 1994 meeting, the Task Force unanimously voiced support that the City reject Caltrans' proposed retrofit of the Central Freeway. The Task Force also supported the position that feasible alternatives to the retrofit have been developed in this study which should be further evaluated based on land use, neighborhood integration, and environmental concerns (see discussion of Next Steps in Chapter 7).

Recognizing that most TAC members regularly attended task force and community meetings, TAC meetings toward the end of the study were not separately scheduled.

PROJECT OBJECTIVES AND EVALUATION CRITERIA

Objectives for the study were taken from the City's Master Plan and Board of Supervisors Resolution 541-92, and were also developed by the Hayes Valley-Western Addition Task Force.

CITY MASTER PLAN OBJECTIVES AND POLICIES

1. MEET THE NEEDS OF ALL RESIDENTS AND VISITORS FOR SAFE, CONVENIENT AND INEXPENSIVE TRAVEL WITHIN SAN FRANCISCO AND BETWEEN THE CITY AND OTHER PARTS OF THE REGION.

   - Involve citizens in planning and developing transportation facilities and services, and in further defining objectives and policies as they relate to district plans and specific projects.
   - Give priority to public transit as the means of meeting San Francisco's transportation needs, particularly those of commuters.
   - Seek means to reduce peak travel demands.

2. USE THE TRANSPORTATION SYSTEM AS A MEANS FOR GUIDING DEVELOPMENT AND IMPROVING THE ENVIRONMENT.

   - Use transportation improvements in the city as catalysts for desirable development, and coordinate new facilities with public and private development.

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- Reduce pollution and noise.
- Design and locate facilities to preserve the natural landscape and to protect views.
- Organize the transportation system to reinforce community identity, improve linkages among interrelated activities and provide focus for community activities.
- Provide incentives for the use of transit, carpools and vanpools, and reduce the need for new or expanded automobile and automobile parking facilities.

3. GIVE FIRST PRIORITY TO IMPROVING TRANSIT SERVICE THROUGHOUT THE CITY, PROVIDING A CONVENIENT AND EFFICIENT SYSTEM AS A FEASIBLE ALTERNATIVE TO AUTOMOBILE USE.

- Improve speed of transit travel and service by giving priority to transit vehicles where conflicts with auto traffic occur, and by establishing a transit preferential streets system.
- Improve inter-district and intra-district transit service.

4. ESTABLISH A THOROUGHFARES SYSTEM (Figure 1-2) IN WHICH THE FUNCTION AND DESIGN OF EACH STREET ARE CONSISTENT WITH THE CHARACTER AND USE OF ADJACENT LAND.

- Divert through automobile and truck traffic from residential neighborhoods onto major and secondary thoroughfares, and limit major thoroughfares to nonresidential streets wherever possible.
- Design streets for a level of traffic that will not cause a detrimental impact on adjacent land uses.
- The existing vehicular capacity of the bridges, highways and freeways entering the city should not be increased and should be reduced where possible.

5. PROVIDE FOR CONVENIENT AND SAFE MOVEMENT AMONG DISTRICTS IN THE CITY DURING NORMAL TRAVEL PERIODS.

- Eliminate unnecessary cross traffic conflicts and improve traffic flow along major thoroughfares.
- Promote increased traffic safety, with special attention to hazards that could cause personal injury.

6. PROVIDE SAFE AND PLEASANT SPACE FOR PEDESTRIANS.

- Widen sidewalks where intensive commercial, recreational, or institutional activity is present and where residential densities are high.

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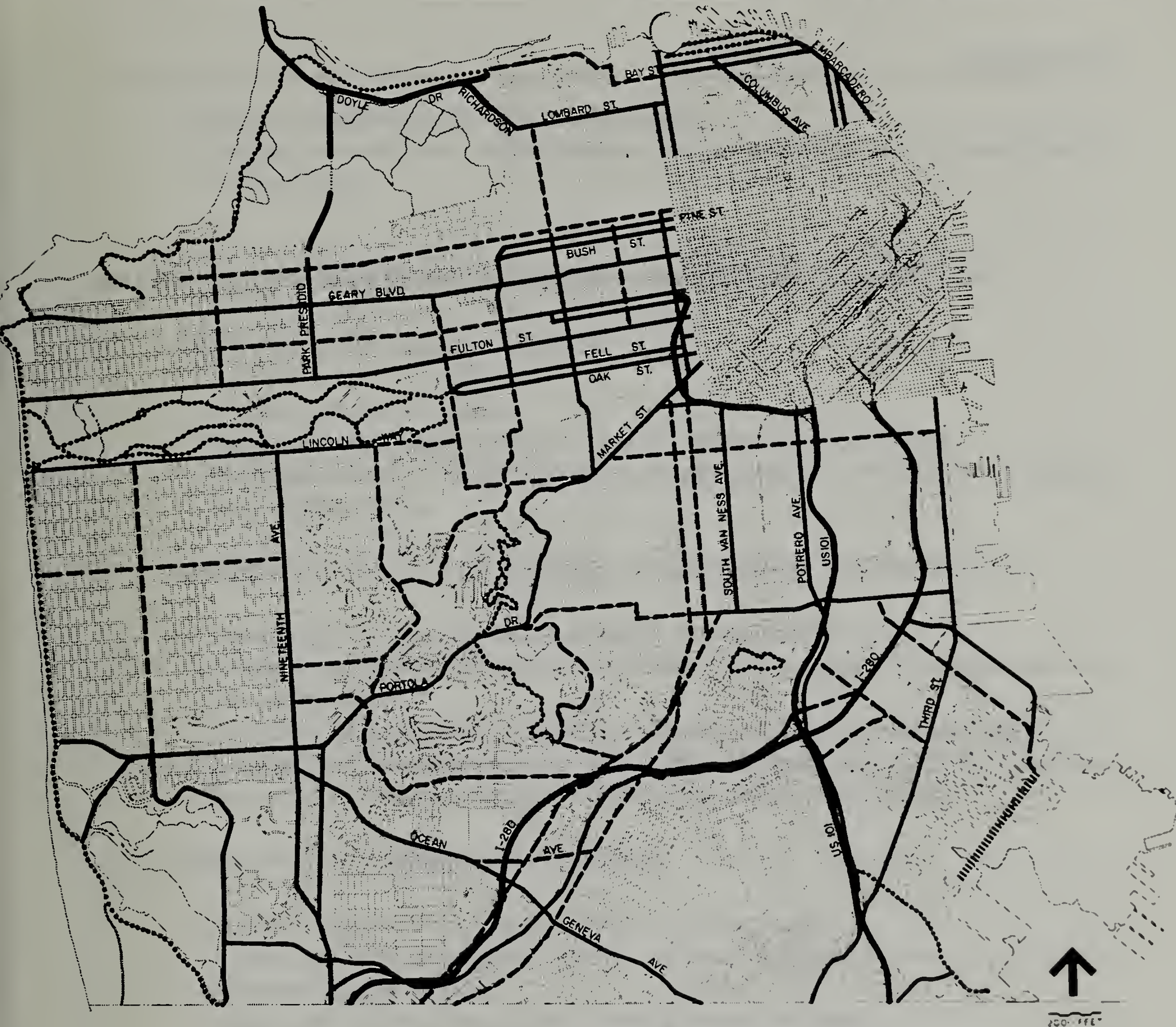

VEHICLE CIRCULATION PLAN

Map 4

- Freeway
- Major Thoroughfare
- Secondary Thoroughfare
- Recreational Streets
- Refer to GUIDE TO THOROUGHFARES PLAN and SOUTH BAYSHORE PLAN for criteria for State Route 230
- Refer to DOWNTOWN TRANSPORTATION PLAN for details within this area

SOURCE: *San Francisco Master Plan Transportation Element*

- Ensure convenient and safe pedestrian crossings.
- Partially or wholly close certain streets not required as traffic carriers for pedestrian use or open space.

HAYES VALLEY-WESTERN ADDITION TASK FORCE OBJECTIVES

A. MAKE A POSITIVE VISUAL IMPACT.

- Provide for visual amenities.
- Apply good urban design principles (e.g., for lighting and landscaping).
- Avoid any overhead structure over Market which blocks the view of the Ferry Building.
- Have aesthetic value.

B. BE APPROPRIATE TO THE UNIQUE CHARACTER OF SAN FRANCISCO.

- Preserve and enhance the unique character of San Francisco.
- Minimize the effects on residential neighborhoods, many of whose buildings predate the 1906 earthquake.
- Recognize the importance of Market as a ceremonial "Main Street" and "spine".
- Avoid any overhead structure over Market which blocks the view of the Ferry Building.
- Recognize aesthetics as a primary attraction for tourists to San Francisco.

C. PROMOTE NEIGHBORHOOD COHESION.

- Permit neighborhoods to rebuild their sense of community.
- Remove the remaining divisive on/off ramps and overhead structures from existing residential neighborhoods.
- Support and reinforce neighborhood-serving commercial districts.
- Allow the maximum reclamation of freeway land for housing and open space in established residential neighborhoods.

D. BE IN ACCORD WITH AN OVERALL PLAN FOR THE AREAS AFFECTED.

- Comply with a comprehensive plan for the areas affected.
- Form part of an implementable program for the reclamation and/or development of the areas as livable environments.
- Minimize the effects on existing housing and be planned in conjunction with the development of future housing and commercial space.

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E. ALLOW FOR BETTER MANAGEMENT OF TRAFFIC.

- Integrate public transit operations with other vehicular and pedestrian traffic.
- Enhance public transit operations.
- Provide more direct access for traffic to the destinations identified in the postcard survey of the traffic study.
- Provide for a more even distribution of traffic.
- Provide for a more appropriate distribution of traffic.
- Distribute traffic more efficiently.

F. PROMOTE A HEALTHY ENVIRONMENT.

- Include open spaces.
- Allow for safe neighborhood streets.
- Support the physical and mental health of both residents and visitors.

PROJECT EVALUATION CRITERIA

Review of these objectives and others developed by the Study's Technical Advisory Committee led to development of a set of evaluation criteria which are summarized below. These criteria were used to evaluate alternatives in Chapter 4.

Visual Impacts: How massive is the freeway structure? Is there opportunity to improve it and the freeway right-of-way as visual entities? What is the impact on views up and down Market Street?

New Right-of-Way: Would new right-of-way need to be acquired?

Developable Land: How much land currently reserved as transportation right-of-way could be freed-up for other uses?

Neighborhood Impacts: What are the impacts on the living and pedestrian environment on neighborhoods north and south of Market?

MUNI Impacts: What impacts would the alternative have on MUNI bus and light rail service in terms of improvement or degradation of traffic flow or required realignment of routes?

Traffic Congestion: How many key intersections would operate at levels of service E and F.

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Traffic Crossing Market At-Grade: How much traffic would cross Market Street on the surface, thereby creating potential congestion.

Design Safety: What compromises (if any) in Caltrans design standards might have to be made to effectuate the alternative? What is likely to be the overall impact on traffic safety resulting from the alternative?

Construction Impacts: How will traffic flow and neighborhood livability be impacted during the construction period?

Estimated Completion Date: How long is it likely to take for completion of the alternative, considering the environmental process, design and construction?

Cost: What is the estimated cost to construct the alternative?

REPORT ORGANIZATION

The remainder of the report is organized to discuss both the alternatives analysis and the signal timing aspects of the project. The remaining Chapters are as follows:

2. Existing Conditions;
3. Alternatives for Evaluation;
4. Alternatives Evaluation;
5. Other Circulation Issues;
6. Signal Timing and Operational Issues;
7. Recommendations; and

   Appendices

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2. EXISTING CONDITIONS

The elimination of the Central Freeway ramps to Gough and Franklin Streets and other earthquake related freeway closures have significantly altered traffic patterns and conditions in the Highway 101 corridor in San Francisco. This impact is most felt between Interstate 80 and the Golden Gate Bridge. These traffic changes as well as existing traffic conditions are presented in Chapter 2. Principal traffic changes are described in terms of traffic flows (volumes) and traffic accidents. Existing traffic conditions are described in terms of traffic flows, levels of congestion, queuing or stacking, and freeway ramp operations. Existing travel speeds are also presented relative to requirements of the City's Congestion Management Plan.

The Central Freeway prior to the Loma Prieta Earthquake consisted of three basic segments.

A. Interstate 80 to Howard/Mission/Otis Streets: a single deck 0.9 mile segment serving 159,000 Average Daily Traffic (ADT) prior to the Quake, and 136,000 ADT today;

B. Otis Street to Oak/Fell Streets: a double deck 0.6 mile segment serving 143,000 ADT prior to the Quake and 94,000 ADT today; and

C. Oak/Fell Streets to Gough/Franklin Streets: a double deck 0.4 mile segment serving 82,000 ADT prior to Quake that has since been removed and has no traffic today.

The Section "A" between I-80 and Mission Street, which is a steel structure, is also planned for major structural retrofit improvements in addition to this study's principal focus which is the double deck reinforced concrete structure north of Mission Street.

EARTHQUAKE IMPACT ON TRAFFIC PATTERNS

Closure of the Gough/Franklin ramps as well as the Embarcadero Freeway, I-280 and Main/Beale ramps has resulted in a major redistribution of freeway access traffic in San Francisco. Such changes are described in this section. In reviewing these comparisons, it should be noted that they are affected by a number of external factors including the downturn in the Bay Area's economy.

Central Freeway Volumes

As shown in Table 2-1, the two-way traffic volume on the segment of the Central Freeway between I-80 and the Mission Street/South Van Ness Avenue exit has decreased by 16 percent from an ADT

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of 159,000 to 136,000[1] since the earthquake. Similarly, the two-way volume on the segment between Mission Street and the Oak/Fell ramps has decreased by 34 percent, from an ADT of 143,000 to 94,000. All (94,000 ADT) traffic on this north of Mission Street segment now exits at a single interchange (Oak/Fell), rather than being dispersed at two interchanges. The Oak/Fell ramps have experienced an average 54 percent traffic increase. Pre- and post-earthquake Central Freeway segment and ramp volumes are shown together in Table 2-1.

Table 2-1
DAILY TRAFFIC VOLUMES - CENTRAL FREEWAY
PRE AND POST QUAKE

Segment	Pre-Quake	Post-Quake	Net Change	Percent Change
I-80 to Mission Street	159,000	136,000	-22,000	-13%
Mission Street to Oak/Fell	143,000	94,000	-49,000	-34%
Oak/Fell to Gough/Franklin	82,000	0	-82,000	---
Ramps				
Oak/Laguna On-Ramp	27,000	47,000	+20,000	+74%
Fell/Laguna Off-Ramp	34,000	47,000	+13,000	+38%
South Van Ness On-Ramp	10,000	22,000	+8,000	+120%
Mission/Van Ness Off-Ramp	16,000	20,000	+4,000	+25%

Truck traffic and Golden Gate Bridge traffic is now directed to use the Mission Street/South Van Ness Avenue ramps. As a result, traffic at the South Van Ness Avenue and Mission Street ramps has increased from 26,000 ADT prior to the earthquake to 42,000 ADT after the quake.

It is probable that increases at individual Central Freeway ramps are not as great in peak hours as over the entire day. Tourists and infrequent travelers who primarily travel in the off-peak, typically follow directional signage, while commuters and residents tend to divert to alternative routes in order to avoid observed or expected back-ups on the Central Freeway.

[1]Traffic data in this section are taken from other reports and DPT traffic data and are based on counts made at various times in the years immediately preceding or following the earthquake.

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Area Traffic Volumes

Table 2-2 shows the overall shifts in traffic and BART patronage that have occurred in San Francisco since the earthquake. Additional traffic added to Nineteenth Avenue (SR-1) and the local South of Market street system after the Loma Prieta Earthquake amounts to approximately 123,000 average daily traffic (ADT) vehicle trips. This is about the same amount of traffic that has been lost on the Embarcadero and Central Freeway combined. The fact that the numbers are so close is coincidental but it can be concluded that the traffic on the old freeways did not just go away, but was largely redistributed onto other San Francisco streets. Also shown in Table 2-2 is the additional ridership that BART has experienced since the earthquake.

A comparison of ramp volumes before and after the Loma Prieta Earthquake is presented in Figures 2-1 and 2-2. Figure 2-3 summarizes which study area roadways have experienced significant increases in traffic since the 1989 earthquake. The figure also shows the traffic conflicts which have been affected by these increased volumes.

Table 2-2
AREAWIDE TRAFFIC IMPACTS-AVERAGE DAILY TRAFFIC
CENTRAL FREEWAY PRE AND POST QUAKE COMPARISON

Street	Pre-Quake ADT	ADT Post-Quake	ADT Difference
South of Market Local Streets	221,300	313,700	+112,400
Nineteenth Avenue	68,000	79,000	+11,000
		Net Increase	**123,400**
Embarcadero Freeway	101,000	0	-101,000
Central Freeway	159,000	136,000	-22,000
		Net Decrease	**123,000**
BART Ridership: West Bay	55,000	65,000	+10,000
Transbay	100,000	120,000	+20,000

After the earthquake, traffic from the Central Freeway has apparently been redistributed onto:

- Nineteenth Avenue-Park Presidio (State Route 1);
- Van Ness Avenue;
- Oak and Fell Streets; and
- South of Market freeway access streets.

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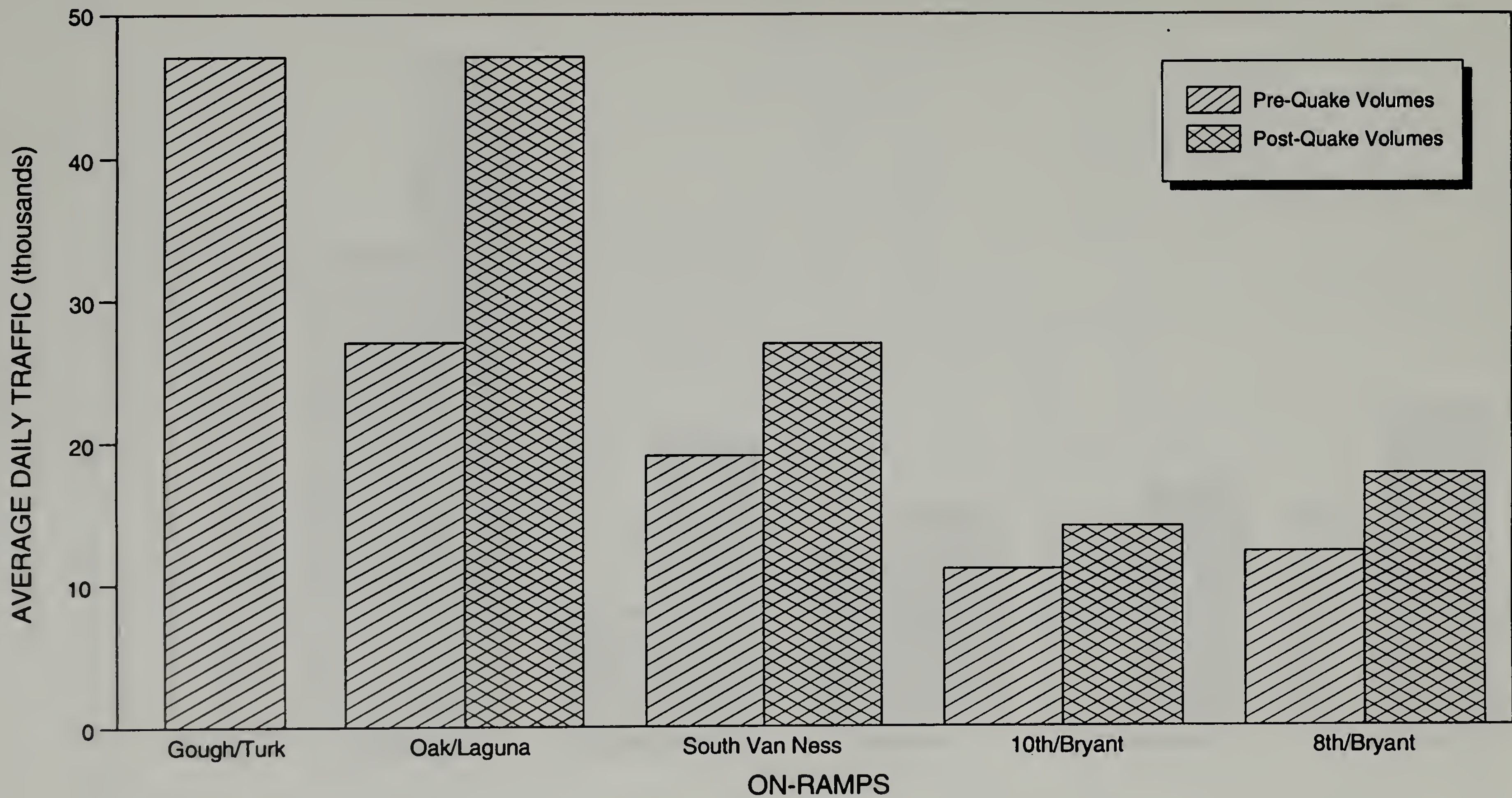

Figure 2-1

COMPARISON OF ON-RAMP VOLUMES BEFORE AND AFTER THE LOMA PRIETA EARTHQUAKE

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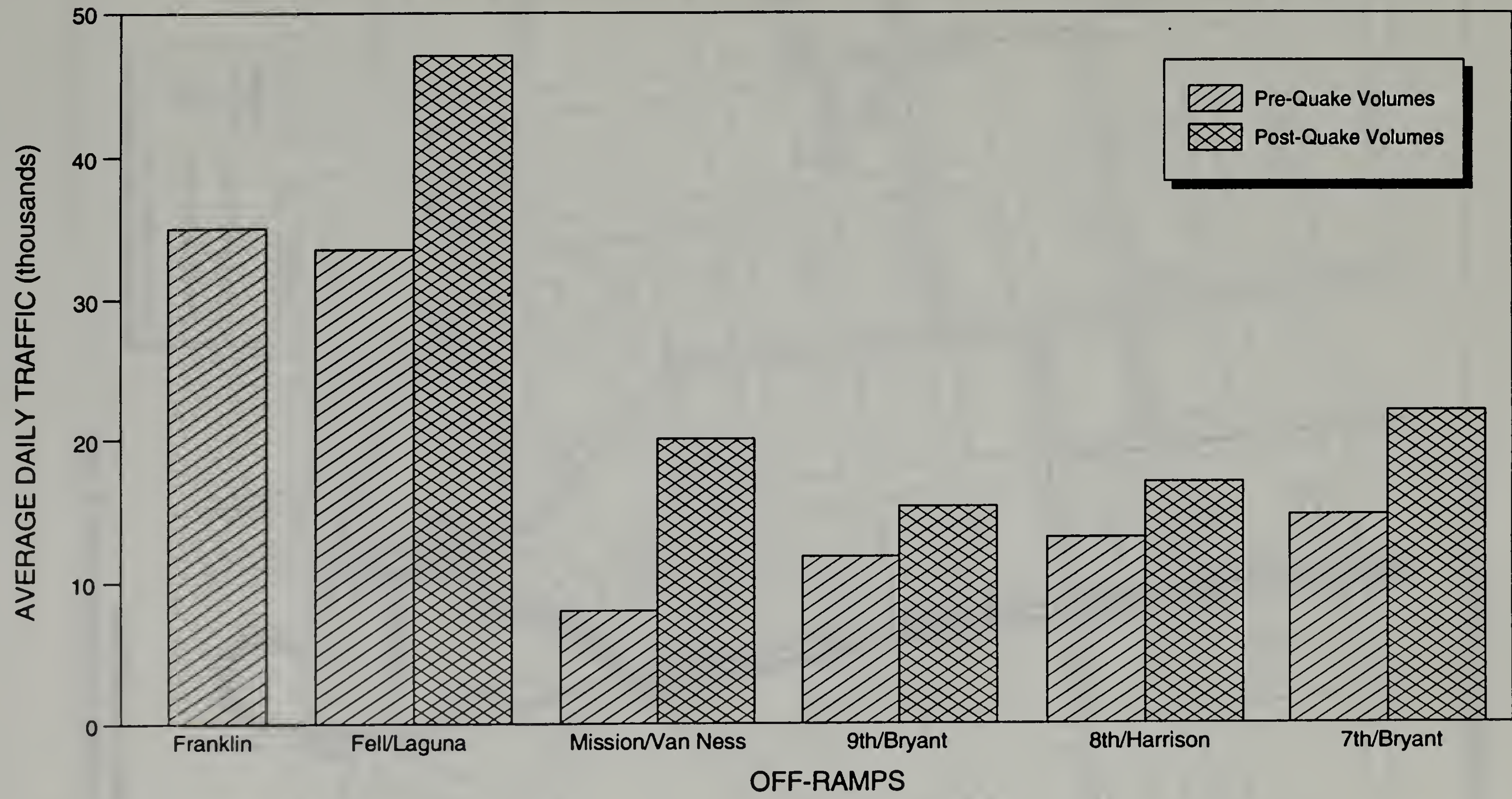

Figure 2-2

COMPARISON OF OFF-RAMP VOLUMES BEFORE AND AFTER THE LOMA PRIETA EARTHQUAKE

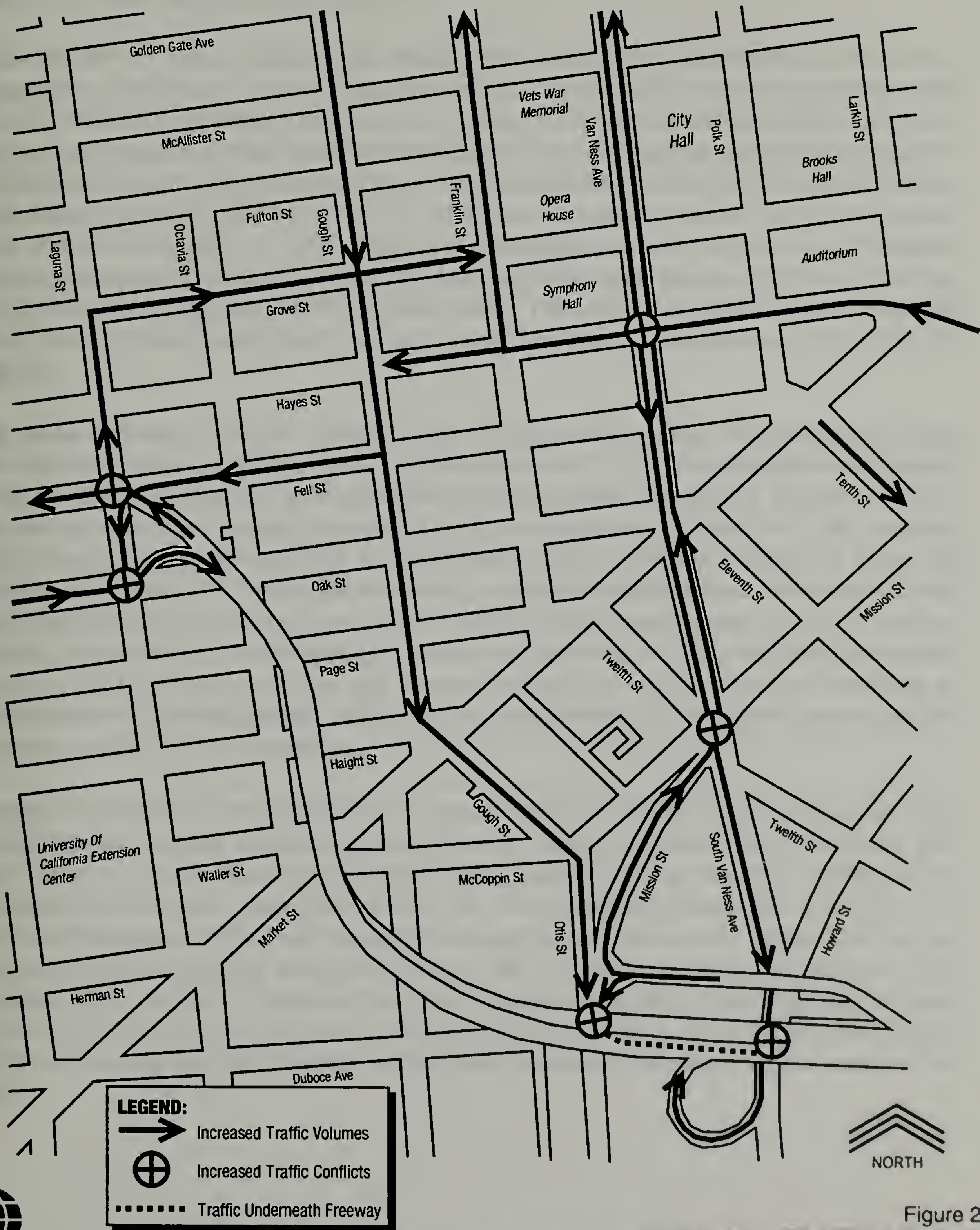

Figure 2-3
INCREASED TRAFFIC VOLUMES SINCE THE 1989 LOMA PRIETA EARTHQUAKE

Impacts on these routes are described below.

State Route 1 - Some Golden Gate Bridge traffic apparently has diverted to Nineteenth Avenue/SR-1 (State Route 1) due to congestion on U.S. 101 and in the Central Freeway area. Park Presidio Boulevard and Nineteenth Avenue to I-280 provide a direct connection between points south of San Francisco and the Golden Gate Bridge and generally have less congestion than the U.S. 101/Bayshore corridor. Since the earthquake, Park Presidio Boulevard at Lake Street, where Golden Gate Bridge traffic using SR-1 enters city streets, had an increase of about two percent from an ADT of 66,000 to an ADT of 67,000. There was a larger increase over this period on Nineteenth Avenue just south of Lincoln Way. Here the ADT increased 16 percent over the period since the 1989 Earthquake, rising from 68,000 to 79,000 ADT.[2] The Doyle Drive Golden Gate Bridge link to the Central Freeway experienced a decrease, almost seventeen percent, from an ADT of 107,000 to 89,000.

Van Ness Avenue - With the removal of the Gough/Franklin ramps all northbound Central Freeway traffic following signs for either Van Ness Avenue or U.S. 101 Northbound is now directed to exit the Central Freeway at the Mission Street/South Van Ness Avenue exit. The Mission Street exit has experienced an increase in traffic of over 25 percent, from an ADT of 16,000 to almost 20,000. From there, northbound U.S. 101 traffic heads north on Mission Street to the South Van Ness Avenue intersection. The northbound traffic (turning left from Mission Street onto northbound South Van Ness Avenue) must cross southbound U.S. 101 traffic (moving south on South Van Ness Avenue) and compete for traffic signal green time at this intersection. Combined, these movements carry over 30,000 vehicles on an average weekday, making this conflict a concern from both an operational and a safety standpoint. This heavy intersection traffic conflict regularly approaches and sometimes reaches gridlock conditions.

Southbound Central Freeway traffic is now directed to follow Van Ness Avenue all the way to the Central Freeway on-ramp at South Van Ness Avenue. Volumes on South Van Ness Avenue have increased by 41 percent, from 19,100 to 26,900 ADT, since the 1989 earthquake. Traffic volumes on this on-ramp have more than doubled since the 1989 earthquake, from 10,000 to 22,000 ADT.[1] Traffic on the segment of Van Ness Avenue between the Central Freeway and Golden Gate Avenue experiences heavy congestion during the AM and PM peak periods, which is in part due to the addition of U.S. 101 traffic. North of Turk Street, traffic on Van Ness Avenue has only increased by a little more than two percent, from 79,000 to 81,000 ADT. This is due to the fact that U.S. 101 traffic that formerly used the Gough/Franklin ramps merged with Van Ness Avenue north of Turk Street.

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[2]Caltrans, 1992, 1989, and 1987 Traffic Volumes on California State Highways, July 1993.

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Gough Street - A significant amount of traffic that used to use the Gough Street on-ramp now continues further south on Gough Street bound for either the Oak/Laguna or South Van Ness on-ramps. Traffic on Gough Street, just south of the demolished on-ramp, has increased by about 67 percent from 16,600 to 27,900 ADT. To get to the Oak/Laguna on-ramp from Gough Street, traffic must turn right on Fell Street and then turn left at Laguna Street while Fell/Laguna off-ramp traffic waits. During peak hours about 600 VPH are estimated to leave Gough Street via Fell Street to reach the Oak Street on-ramp. Traffic volumes on the Oak/Laguna on-ramp have increased by 74 percent, from an ADT of 27,000 to 47,000. Fell/Laguna off-ramp traffic has increased by 40 percent from 34,000 to 47,000 since the 1989 earthquake. With the additional Gough Street traffic heading for the on-ramp and crossing the increased traffic on the Fell/Laguna off-ramp, operations and safety have deteriorated. Traffic on Thirteenth/Duboce Streets has also increased as some former Gough Street on-ramp traffic attempts to access the South Van Ness Avenue Central Freeway on-ramp via Otis Street.

Oak/Fell Streets - Both Fell and Oak Streets have experienced significant increases in traffic since the 1989 earthquake. Traffic volumes on Oak Street just west of the Central Freeway on-ramp have increased by thirty percent, from 35,000 to 45,500 ADT and Fell Street traffic west of the Central Freeway off-ramp has increased by twenty percent, from 34,500 to 41,400 ADT. In addition to this, some motorists now turn right onto northbound Laguna Street from the Fell/Laguna off-ramp to access the Civic Center area and the Van Ness Avenue corridor. This has caused traffic volumes on Laguna Street to increase by about fifty-eight percent, from 5,800 to 9,000 ADT, since the 1989 earthquake.

South of Market Streets - Traffic has also increased on Ninth and Tenth Streets as some motorists have shifted to the ramps at Harrison and Bryant Streets instead using of the Central Freeway. Traffic on Ninth Street at Howard Street has increased by about thirty percent, from 26,100 to 33,900 ADT. Traffic volumes on Tenth Street at Howard Street have increased by twenty-one percent, from 18,200 to 22,100 ADT.

Local Street Volumes

A summary of the changes in the vehicles per day, or Average Daily Traffic (ADT), on study roadways is shown in Table 2-3.

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Table 2-3
DAILY TRAFFIC VOLUMES BEFORE AND AFTER
THE LOMA PRIETA EARTHQUAKE

Location	Pre-Quake	Post-Quake	Net Change
Van Ness Ave. north of Turk Street	79,000	81,000	+2%
Van Ness Ave. north of California St.	68,000	70,000	+3%
Mission/Van Ness Off-Ramp	16,000	20,000	+25%
South Van Ness On-Ramp	10,000	22,100	+120%
South Van Ness at Howard	19,100	26,900	+41%
Seventh St. south of Howard	10,000	17,517	+59%
Eighth St. south of Howard	14,700	21,359	+16%
Ninth St. south of Howard	26,100	33,900	+30%
Doyle Drive	107,000	67,000	-17%
SR-1 south of Lake Street	68,000	67,000	+2%
SR-1 south of Lincoln Way	68,000	79,000	+16%
Tenth St. south of Howard	18,200	22,100	+21%
Fell St. west of Laguna	34,500	41,400	+20%
Oak St. west of Laguna	35,000	45,500	+30%
Laguna St. west of Fell	5,700	9,000	+58%
Gough St. south of Golden Gate	16,600	27,900	+67%
Franklin St. at California	28,700	31,300	+8%

ACCIDENT PATTERNS IN THE STUDY AREA

Safety problems have resulted from post-earthquake shifts in traffic patterns. As previously discussed, large volumes of Central Freeway traffic conflict at the intersections of Mission/South Van Ness and Fell/Laguna. At both of these points, northbound traffic must share its signal green time with the southbound traffic. Resulting traffic conflicts have pushed these two intersections up on the City's list of high accident locations in San Francisco. The list, prepared by the Department of

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Parking and Traffic, includes all locations that have had eight or more accidents reported to the police in the previous year. High accident locations in the study area are shown in Table 2-4 and in Figure 2-4.

Table 2-4
HIGH ACCIDENT LOCATIONS IN THE CENTRAL FREEWAY STUDY AREA
Page 1 of 2

Intersection	# of Accidents in 1993	1993 Ranking	1988 Ranking	Change in Rank
13th Street, Howard, South Van Ness	23	2	14	+1[illegible]
Market, Van Ness	20	3	31	+22
7th St. & Mission	16	6	75	+69
10th St. & Harrison	16	6	9	+3
12th St., Mission, Otis, South Van Ness	15	18	75	+69
7th St. & Howard	10	14	75	+61
9th St. & Howard	10	14	N.L.	+62
Broadway and Van Ness	10	14	1	-13
Gough, Haight, Market	13	18	N.L.	+58
13th St, Mission, US 101 Off-Ramp, Otis	12	21	31	+10
Duboce Ave. & Valencia	12	21	N.L.	+58
Ellis & Van Ness	12	21	N.L.	+55
O'Farrell & Van Ness	12	21	43	+22
Pine & Van Ness	12	21	75	+54
8th St. & Folsom	1[illegible]	28	N.L.	+48
Bay St. & Van Ness	11	28	N.L.	+48
Fell & Laguna	1[illegible]	28	75	+47
6th St. & Harrison	10	34	9	-25
8th St. & Bryant	10	34	43	+3
8th St. & Harrison	9	42	N.L.	+34
9th St. & Folsom	9	42	75	+33
10th St. & Mission	9	42	N.L.	+34
California & Van Ness	9	42	31	-11
Eddy & Leavenworth	9	42	N.L.	+34

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Figure 2-4
HIGH ACCIDENT LOCATIONS IN THE STUDY AREA

Table 2-4
HIGH ACCIDENT LOCATIONS IN THE CENTRAL FREEWAY STUDY AREA
Page 2 of 2

Intersection	# of Accidents in 1993	1993 Ranking	1988 Ranking	Change in Rank
Eddy & Van Ness	9	42	43	+1
Leavenworth & Sutter	8	42	N.L.	+34
Oak & Scott	8	42	N.L.	+34
Guerrero, Hermann, Laguna, Market	8	63	N.L.	+13
7th St. & Harrison	8	63	N.L.	+13
10th & Howard	8	63	N.L.	+13
Fillmore & Oak	8	63	57	-6
Geary & Hyde	8	63	N.L.	+13
Oak & Steiner	8	63	N.L.	+13
Pacific & Van Ness	8	63	N.L.	+13

N.L. = Not on the list in 1988. (Had a ranking of 76 or greater)
Average increase in rank since the 1989 Loma Prieta Earthquake = 27
Number of 1988 high accident locations in the study area that dropped off the list = 7

Overall, the City's accident records indicate a trend of increasing accidents in the Central Freeway study area. Before the 1989 earthquake there were twenty-eight study intersections on the high accident list. In 1992, there were 37 on the list and in 1993 there were 35 on the list. Most of those that were already on the list have moved up in ranking since the earthquake.

The intersection of Mission Street and South Van Ness Avenue has moved from the ranking of seventy-fifth to twelfth since the 1989 earthquake, with the number of accidents more than doubling from eight accidents in 1988 to eighteen accidents in 1992 and fifteen in 1993. The intersection of Market Street and Van Ness Avenue, with all of U.S. 101 traffic now passing through it, has also moved up the list of high accident locations from thirty-first to third in 1993. The intersections of Van Ness/Market and Fell/Laguna have both had pedestrian fatalities in the last year.

Of particular concern is the fact that the intersection of South Van Ness Avenue/Howard and Thirteenth Streets has moved from a ranking of 14th before the 1989 earthquake (13 accidents in 1988) to first in 1992 and second in 1993. This intersection had 44 accidents in 1992, twice that of the second ranked intersection. Three of these accidents involved pedestrians. This is at least partially attributable to the increased volumes on the South Van Ness Avenue on-ramp which often backs up into the intersection, creating increased risk of accidents.

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Another intersection of concern is the Mission Street/Otis Street/Duboce Avenue/U.S. 101 northbound off-ramp intersection. This intersection has moved up the list to 12th in 1992 and 21st in 1993 from 31st before the 1989 earthquake. There were 11 accidents in 1988 and 14 accidents at this intersection in 1992 and 12 in 1993. Safety problems were observed for the "free" right-turn from the U.S. 101 northbound off-ramp to Mission Street. A MUNI bus stop is located on the island separating the U.S. 101 off-ramp right-turn from Mission Street traffic. Buses stopping at this island obstruct the view of Mission Street traffic for off-ramp drivers turning right. A pedestrian crosswalk without a pedestrian signal crosses this off-ramp, free flow right-turn. Drivers looking left to merge with Mission Street traffic often do not see pedestrians running to catch buses or the walk signal across Mission and Otis Streets.

In summary, a significant increase has resulted in traffic accidents on local streets since the 1989 earthquake.

EXISTING TRAFFIC CONDITIONS

Traffic conditions in the Study Area are often subject to major changes as a result of incidents on the freeway system as well as on key arterials. It is common, for example, for problems on local streets to spill over onto the Central Freeway and vice versa. These spillover impacts illustrate this simple traffic relationship: as traffic capacity is reached, unstable flow (gridlock) develops which further reduces effective capacity and begins to rapidly stack or queue traffic. The shorter city block spacings and the shorter freeway holding areas, the greater the likelihood that a single capacity problem will spill over and disrupt a much broader area.

Origin-Destination Patterns

In order to get a general picture of origin-destination patterns for Central Freeway motorists, a one-day (7:00 AM to 5:30 PM weekday) postcard survey of motorists exiting the Central Freeway was conducted at the off-ramps at Eighth, Mission and Fell Streets[3]. Figures 2-5 through 2-7 present a summary of origin-destination information compiled for each off-ramp. Some destination categories are not shown in Table 2-5, such as the South Bay and Southern San Francisco zones.

Summary of Key Findings on Origin-Destination Patterns

- During the hours the survey was conducted, approximately 93 percent of Central Freeway motorists reported they were bound for destinations within San Francisco.

[3]Postcard distribution had to end at 5:30 PM because of safety considerations resulting from the onset of darkness.

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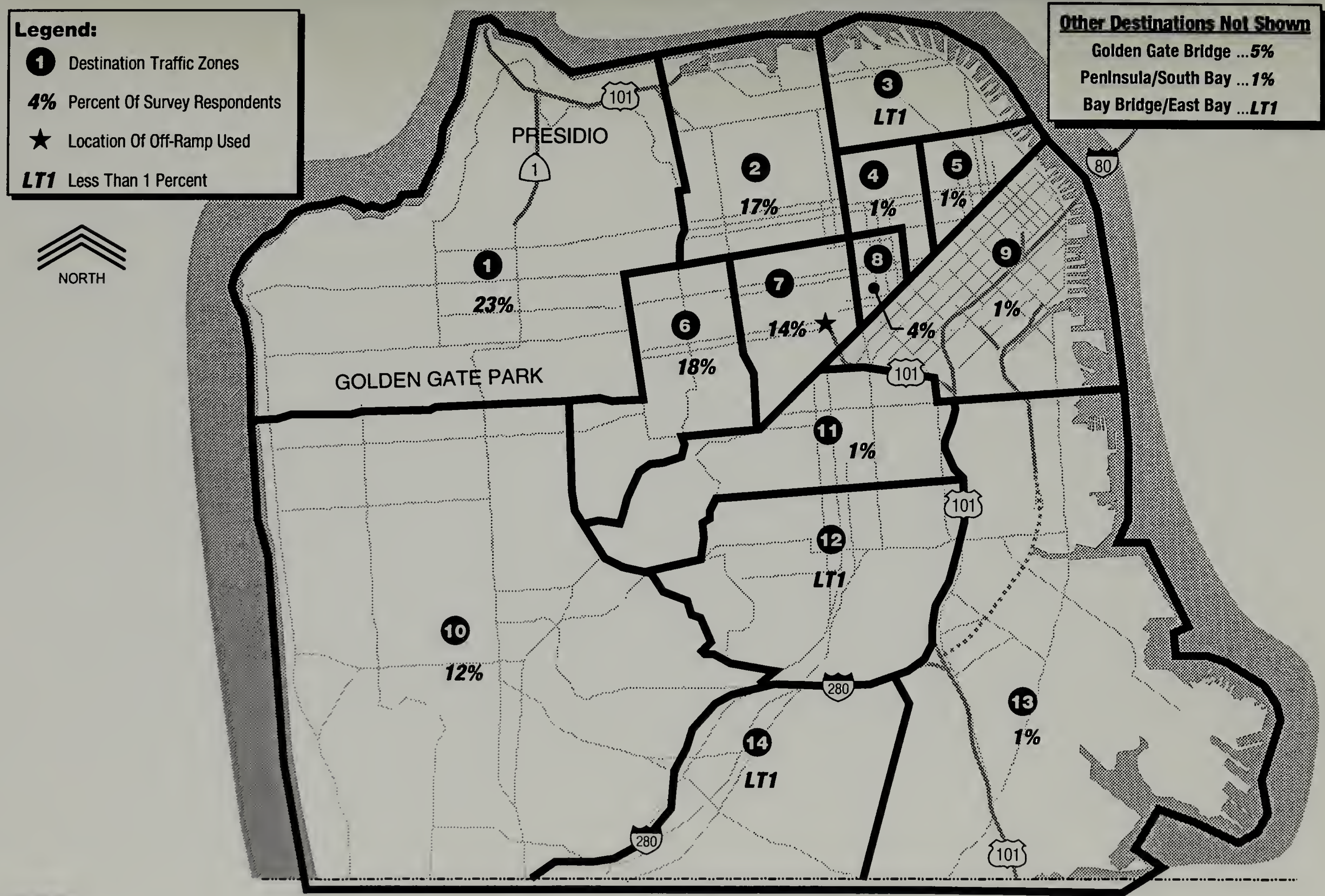

Figure 2-5
DESTINATIONS OF MOTORISTS USING THE CENTRAL FREEWAY FELL/LAGUNA OFF-RAMP

WILBUR SMITH ASSOCIATES

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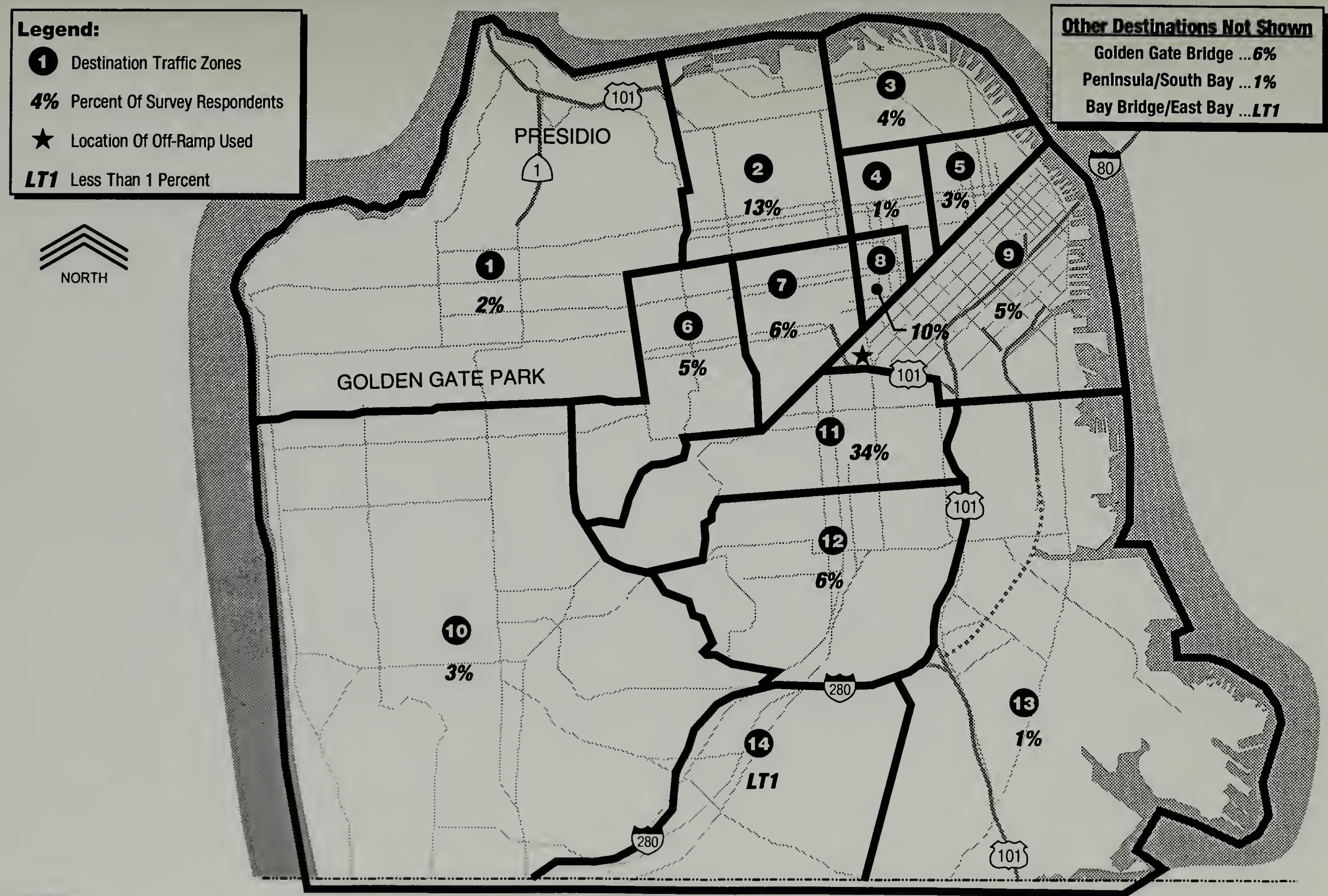

Figure 2-6

DESTINATIONS OF MOTORISTS USING THE U.S. 101 NB MISSION/VAN NESS OFF-RAMP

WSA WILBUR SMITH ASSOCIATES

DF-FINAL\DESTINAT-8/10/94P

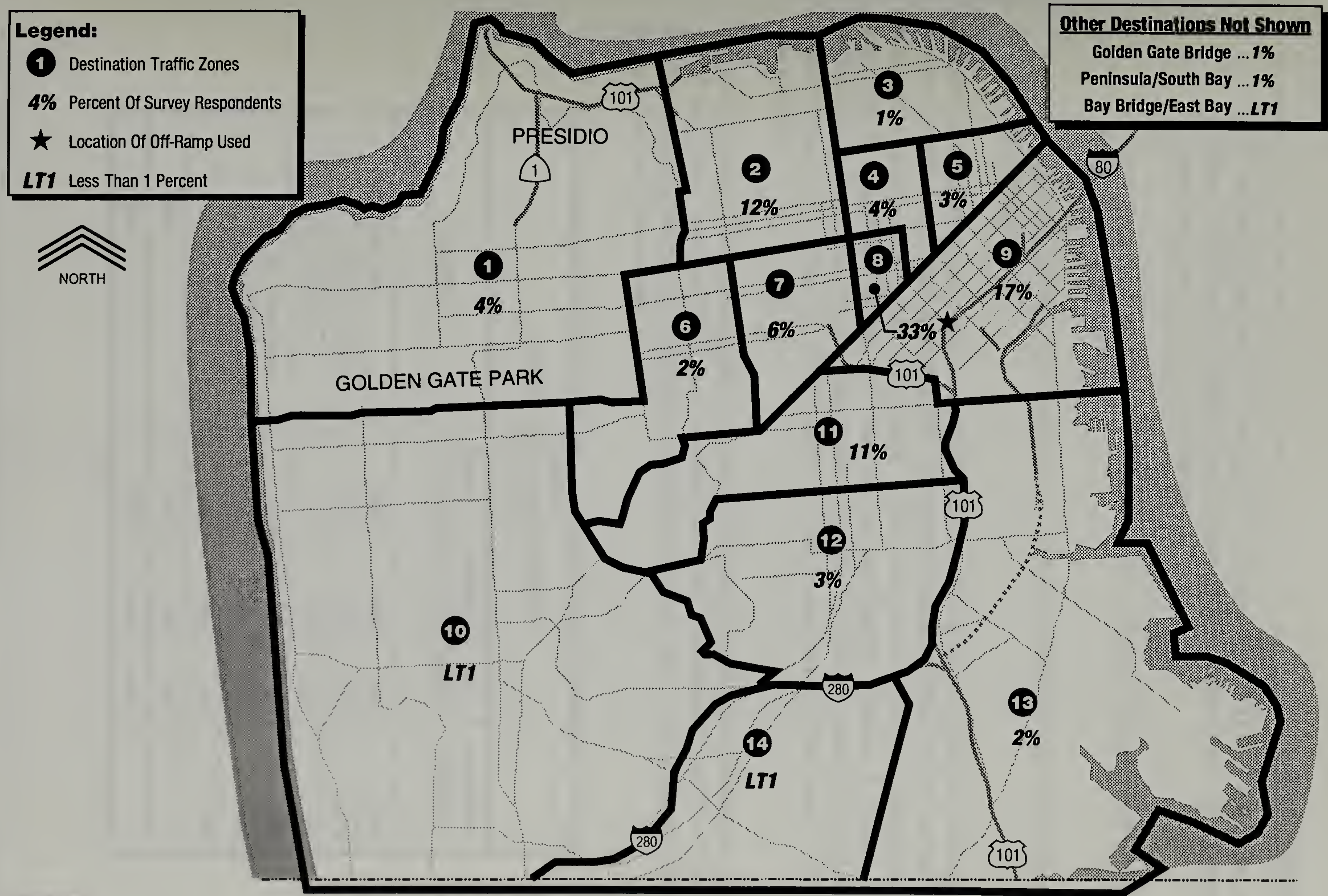

Figure 2-7
DESTINATIONS OF MOTORISTS USING THE I-80 WB 8TH & HARRISON OFF-RAMP

- At the Fell/Laguna ramp, 14 percent of the motorists surveyed had a destination in the Hayes Valley/Western Addition and 52 percent had a destination in the Richmond, Sunset, or Upper Haight/USF/UCSF areas.

- Thirty-nine percent of all motorists bound for the Golden Gate Bridge exited the freeway at the Fell/Laguna off-ramp.

- Approximately 86% of the motorists surveyed reported that their trip originated outside San Francisco.

Seventy-six percent of the respondents reported they were driving alone, 18 percent reported there were two people in the vehicle, 4 percent reported there were three people, and 2 percent responded that they had four or more people in the vehicle. Ninety-three percent of the respondents reported they were in a passenger vehicle (an auto, van, or motorcycle). Another 6 percent of the respondents said they were in a two-axle commercial truck. The other 1 percent reported driving larger trucks and other vehicles. About 37 percent of the respondents reported being a resident of San Francisco.

As shown in Table 2-5, vehicle occupancy and vehicle classification profiles were similar for all three ramps surveyed. A higher proportion of motorists using the Mission/South Van Ness and Fell/Laguna Street ramps reported being San Francisco residents. The origin-destination patterns of motorists varied considerably by ramp.

Table 2-5
SURVEY RESPONSE SUMMARY[1]
Page 1 of 2

Question	Eighth/ Harrison	Mission/ Van Ness	Fell/ Laguna	Weighted Average[1]
Origin:				
Bay Bridge	96%	42%	45%	54%
Peninsula/South Bay	[illegible]%	41%	27%	32%
Potrero/Bayshore	1%	9%	12%	7%
S.O.M.A./China Basin	1%	2%	3%	2%
Army St./Bernal Heights	0%	2%	4%	2%
Financial District	0%	3%	6%	2%
Other	0%	1%	3%	---
Total	100%	100%	100%	---

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Table 2-5
SURVEY RESPONSE SUMMARY
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Question	Eighth/ Harrison	Mission/ Van Ness	Fell/ Laguna	Weighted Average
Destination:				
Mission/Castro	10%	40%	1%	34%
Civic Center Area	33%	8%	1%	14%
Richmond District	4%	8%	23%	2%
S.O.M.A./China Basin	17%	6%	1%	8%
Upper Haight/USF/UCSF	2%	8%	17%	4%
Pacific Heights/Marina	10%	18%	17%	13%
W. Addition/Hayes Valley	6%	6%	14%	8%
Sunset District	1%	3%	12%	8%
Golden Gate Bridge	1%	6%	1%	5%
Other	10%	18%	1%	---
Total	100%	100%	100%	---
Occupancy:				
1 Pax	75%	77%	77%	77%
2 Pax	19%	18%	17%	13%
3 Pax	5%	4%	1%	1%
>3 Pax	6%	1%	2%	4%
Total	100%	100%	100%	---
Vehicle Type:				
Passenger Vehicle	93%	91%	95%	91%
Two-Axle Commercial	6%	8%	5%	8%
Three-Axle Commercial	1%	1%	0%	1%
Total	100%	100%	100%	---
S.F. Residency:				
Yes	4%	42%	51%	33%
No	96%	58%	49%	67%
Total	100%	100%	100%	---

[1]Survey responses were weighted according to the relative volumes of each ramp at the time of the survey.

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The largest amount (about 24 percent) of general comments received pertain to the need for improved public transit service. Another 19 percent commented on the need for increased enforcement of traffic and/or parking regulations. A summary of the comments received is shown in Table 2-6.

Table 2-6
SUMMARY OF POSTCARD SURVEY COMMENTS

Off-Ramp	Type of Comment	Percent of Off-Ramp Comments
I-80 WB at 8th & Harrison	Public transit needs to be greatly improved.	10%
	There needs to be increased enforcement of traffic and parking regulations.	18%
	I-280 should be reopened as soon as possible.	7%
101 NB Mission/Van Ness	Public transit needs to be greatly improved.	23%
	The Central Freeway and/or the corridor to the Golden Gate is a very important travel route.	20%
	There needs to be increased enforcement of traffic and parking regulations.	20%
	The area needs more timed signals like Gough and Franklin.	11%
	Rebuild the demolished Gough/Franklin ramps.	10%
Central Freeway NB Fell/Laguna	Public transit needs to be greatly improved.	27%
	There needs to be increased enforcement of traffic and parking regulations.	20%
	The Central Freeway and/or the corridor to the Golden Gate is a very important travel route.	14%
	The area needs more timed signals like Gough and Franklin.	10%
	I-280 should be reopened as soon as possible.	8%
	Rebuild the demolished Gough/Franklin ramps.	7%

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Regional Journey to Work Travel Patterns

Comparison of 1980 and 1990 Census journey to work patterns for the Bay Area indicates that the number and proportion of San Francisco residents commuting to jobs in the suburbs has increased from 46,600 in 1980 to 71,600 in 1990, a 54 percent increase. During this same time period residents commuting to San Francisco jobs increased from 284,300 to 307,400 (eight percent increase) and suburban residents commuting to San Francisco jobs increased from 224,300 to 248,000 (eleven percent increase). In 1990, 38 percent of San Francisco residents commuted by transit to San Francisco jobs versus 16 percent to suburban jobs. The implication of these commute changes is that more San Francisco residents are commuting to suburban jobs, and these commute trips tend to be more highway than transit oriented.

Level-Of-Service Analysis

The study involved an extensive program of traffic volume data collection. A survey of PM peak hour volumes is shown in Figure 2-8. Eighty-five intersections were analyzed for the AM, midday, and PM peak periods where counts were available. Figure 2-9 shows the definitions and volume-to-capacity ranges for each Level-of-Service (LOS) from A through F. Table 2-7 presents a summary of the results of the LOS analysis, listing the volume-to-capacity ratios for each time period. The Level of Service (LOS) was calculated using the intersection capacity utilization method. It is important to note that this analysis methodology does not fully recognize the impacts on traffic capacity of the high volume of MUNI and Golden Gate transit bus traffic nor pedestrian conflicts. Bus and pedestrian traffic conflicts can significantly reduce the effective capacity of intersections. As such, the LOS analyses tend to indicate that intersections operate better than actual conditions.

Table 2-7
EXISTING INTERSECTION OPERATIONS IN THE CENTRAL FREEWAY STUDY AREA
Page 1 of 4

#	Intersection		Volume to Capacity Ratios		
	N-S Street	E-W Street	AM	Midday	PM
1	Richardson	Francisco	0.85	0.60	0.82
2	Richardson/Baker	Chestnut	0.82	0.51	0.72
3	Broderick	Lombard	0.85	0.59	0.82
4	Divisadero	Lombard	0.87	0.60	0.86
5	Scott	Lombard	0.66	0.60	0.86
6	Pierce	Lombard	0.85	0.54	0.84
7	Steiner	Lombard	0.86	0.59	0.84
8	Fillmore	Lombard	0.88	0.58	0.86

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Table 2-7
EXISTING INTERSECTION OPERATIONS IN THE CENTRAL FREEWAY STUDY AREA
Page 2 of 4

#	Intersection		Volume to Capacity Ratios		
	N-S Street	E-W Street	AM	Midday	PM
9	Webster	Lombard	0.82	0.48	0.80
10	Buchanan	Lombard	0.79	0.58	0.77
11	Laguna	Lombard	0.89	0.56	0.84
12	Octavia	Lombard	0.74	0.49	0.74
13	Gough	Lombard	0.78	0.56	0.84
14	Franklin	Lombard	0.74	0.51	0.86
15	Van Ness	Bay	**1.07**	0.65	0.61
16	Van Ness	Francisco	0.40	0.40	0.43
17	Van Ness	Chestnut	0.40	0.41	0.46
18	Van Ness	Lombard	**0.92**	0.63	0.83
19	Van Ness	Greenwich	0.84	0.59	0.58
20	Van Ness	Filbert	0.86	0.59	0.71
21	Van Ness	Union	0.90	0.66	0.69
22	Van Ness	Green	**0.92**	0.66	0.70
23	Van Ness	Vallejo	**0.92**	0.67	0.70
24	Van Ness	Broadway	0.76	0.64	0.75
25	Van Ness	Pacific	0.80	0.74	0.67
26	Van Ness	Jackson	0.81	0.68	0.67
27	Van Ness	Washington	0.75	0.62	0.74
28	Van Ness	Clay	0.76	0.65	0.76
29	Van Ness	Sacramento	0.87	0.78	0.79
30	Van Ness	California	0.87	0.74	0.83
31	Van Ness	Pine	**0.94**	0.81	0.86
32	Van Ness	Bush	0.86	0.76	0.90
33	Van Ness	Sutter	0.82	0.71	0.78
34	Van Ness	Post	0.80	0.73	0.82
35	Van Ness	Geary	0.87	0.78	0.84
36	Van Ness	O'Farrell	0.81	0.80	0.90
37	Van Ness	Ellis	0.85	0.77	0.79
38	Van Ness	Eddy	0.78	0.76	0.83

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Table 2-7
EXISTING INTERSECTION OPERATIONS IN THE CENTRAL FREEWAY STUDY AREA
Page 3 of 4

#	Intersection		Volume to Capacity Ratios		
	N-S Street	E-W Street	AM	Midday	PM
39	Van Ness	Turk	0.88	0.77	0.87
40	Van Ness	Golden Gate	0.78	0.75	0.87
41	Van Ness	McAllister	0.78	0.75	0.90
42	Van Ness	Grove	0.78	0.79	0.84
43	Van Ness	Hayes	0.82	0.51	0.84
44	Van Ness	Fell	0.86	0.78	**0.91**
45	Van Ness	Market	0.75	0.70	0.84
46	Divisadero	Fell	N/A	N/A	0.67
47	Divisadero	Oak	N/A	N/A	0.78
48	Laguna	Fell	**0.91**	0.87	**0.91**
49	Laguna	Oak	**1.03**	0.78	0.79
50	Octavia	Fell	N/A	N/A	0.69
51	Octavia	Oak	N/A	N/A	0.54
52	Octavia	Page	N/A	N/A	0.42
53	Octavia	Haight	N/A	N/A	0.39
54	Octavia	Market	N/A	N/A	0.89
55	Gough	Pine	0.80	0.59	0.69
56	Gough	Bush	0.86	0.59	0.70
57	Gough	Geary	0.77	0.59	0.75
58	Gough	Turk	0.86	0.69	0.71
59	Gough	Golden Gate	0.78	0.82	0.65
60	Gough	Fell	0.50	N/A	0.67
61	Gough	Oak	0.59	N/A	0.69
62	Gough	Market/Haight	**0.92**	0.86	**1.18**
63	Franklin	Pine	0.73	0.70	0.86[1]
64	Franklin	Bush	0.69	0.69	0.70[1]
65	Franklin	Geary	0.51	0.43	0.78
66	Franklin	O'Farrell	0.56	0.55	0.69
67	Franklin	Turk	0.42	0.42	0.69
68	Franklin	Golden Gate	0.50	0.40	0.51

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Table 2-7
EXISTING INTERSECTION OPERATIONS IN THE CENTRAL FREEWAY STUDY AREA
Page 4 of 4

#	Intersection		Volume to Capacity Ratios		
	N-S Street	**E-W Street**	**AM**	**Midday**	**PM**
69	Franklin	Fell	0.84	N/A	0.63
70	Franklin	Oak	0.74	N/A	0.32
71	Franklin	Page/Market	0.42	0.74	0.82
72	Tenth	Market	0.87	0.36	0.57
73	Ninth	Market	0.57	0.42	0.71
74	S. Van Ness	Mission	0.72	0.66	0.84
75	NB 101 Off-Ramp	Mission	**0.92**	0.87	**0.97**
76	S. Van Ness	Howard	0.85	0.86	**0.99**
77	S. Van Ness	Duboce/13th	0.77	0.82	0.87
78	Tenth	Harrison	N/A	N/A	0.63
79	Ninth	Harrison	N/A	N/A	0.68
80	Eighth	Harrison	0.57	0.68	0.71
81	Seventh	Harrison	N/A	N/A	**0.99**
82	Tenth	Bryant	0.50	0.49	0.59
83	Ninth	Bryant	0.51	0.48	0.71
84	Eighth	Bryant	N/A	N/A	0.60
85	Seventh	Bryant	N/A	N/A	0.68

Notes: (1) Turning movements were manually readjusted to account for six approaches.
N/A: Turning movements were not available for this time period.

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Figure 2-8
PM PEAK HOUR VOLUMES

The **CRITICAL MOVEMENT ANALYSIS METHODOLOGY**, which is described in the Transportation Research Board's *Circular 212*, defines Level of Service (**LOS**) for signalized intersections in terms of the ratio of critical movement traffic volumes to an estimate of maximum capacity for critical volume at an intersection. Critical movements at an intersection are calculated by determining the maximum traffic volumes for conflicting traffic movements (i.e. left-turns plus opposing through traffic) per single stream of traffic (by lane). Approximate ranges for average vehicle stop delay are provided by *Circular 212* for descriptive purposes. However, the **LOS** for intersections are entirely determined by the ratio of critical movement volume to critical movement capacity (volume-to-capacity ratio = V/C) for the entire intersection. Six categories of **LOS** are defined, ranging from **LOS 'A'** with minor delays to **LOS 'F'** with delays averaging more than 40 seconds during the peak hour.

LOS 'A'
V/C Range .... 0.00 - 0.60
Average Stop Delay (seconds) .... 00.0 - 16.0

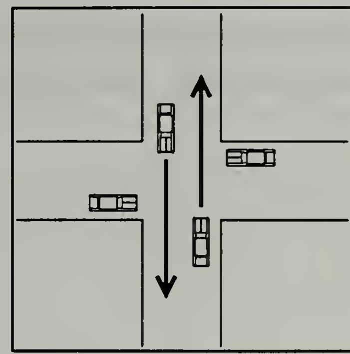
LOS 'B'
V/C Range .... 0.61 - 0.70
Average Stop Delay (seconds) .... 16.1 - 22.0

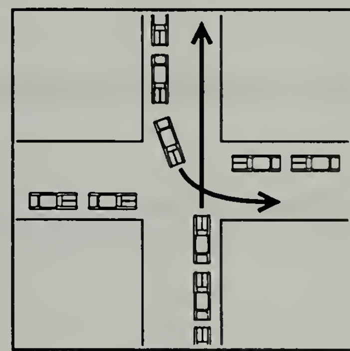
LOS 'C'
V/C Range .... 0.71 - 0.80
Average Stop Delay (seconds) .... 22.1 - 28.0

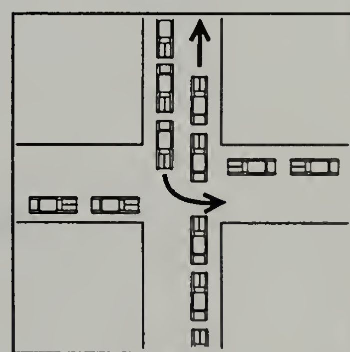
LOS 'D'
V/C Range .... 0.81 - 0.90
Average Stop Delay (seconds) .... 28.1 - 35.0

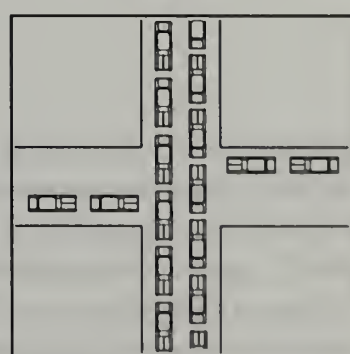
LOS 'E'
V/C Range .... 0.91 - 1.00
Average Stop Delay (seconds) .... 35.1 - 40.0

LOS 'F'
V/C Range[1]
-Measured .... 1.00 or less
-Forecast .... 1.01 or more
Average Stop Delay (seconds) .... 40.1 plus


LOS 'A'


LOS 'C'


LOS 'D'


LOS 'F'

[1] While forecasting demands can exceed maximum capacity, actual measured volumes theoretically cannot. Since traffic flow inefficiencis arise at capacity demand conditions, measured traffic volumes can decrease below maximum flow capacity and thereby calculated V/C ratios for LOS 'F' conditions can be substantially below V/C = 1.00.

SOURCE: Transportation Research Board, "Planning Level Methodology-Signalized Intersection", *Circular 212*, Jan., 1980.

Figure 2-9
LEVEL OF SERVICE DIAGRAM - SIGNALIZED INTERSECTIONS

The capacity level of service analysis presented in Table 2-7 indicates that two intersections operate at LOS F, four at LOS E and 17 at LOS D during the morning peak traffic hour. These problem intersections are:

F - Van Ness Avenue and Bay Street;
F - Laguna and Oak Streets;
E - Van Ness Avenue and Lombard Street;
E - Laguna and Fell Streets;
E - Gough and Market Streets; and
E - Mission Street and Highway 101 off-ramp.

During the weekday midday none of the 85 study intersections were calculated to operate at LOS F or E and only four operated at LOS D.

During the PM peak hour one intersection was assessed to operate at LOS F, five at LOS E and 22 at LOS D.

F - Gough and Market Streets;
E - Harrison and Seventh Streets;
E - Mission Street and Highway 101 off-ramp;
E - South Van Ness Avenue and Howard Street;
E - Van Ness Avenue and Fell Street; and
E - Laguna and Fell Streets.

Other observed problem intersections during the PM peak hour include:

- Van Ness Avenue and Hayes Street;
- Market Street and Franklin Street;
- Market Street and Van Ness Avenue;
- South Van Ness Avenue and Mission Street; and
- South Van Ness Avenue and Thirteenth Street.

Because of the very high volumes of pedestrians and stopping buses (which often block through traffic lanes), the assessment summarized in Table 2-7 undoubtedly understates congestion problems at some intersections. The LOS analysis also treats each intersection as an independent location not impacted by adjacent intersection congestion or inefficient traffic signal progression timing. Traffic survey data represents normal operations. Spillover congestion from freeways, impacts caused by local street accidents or construction related lane closures also sometimes result in worse conditions than are shown in Table 2-7.

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Queuing In The Study Area

The main areas of queuing in the study area were identified based on field observations. The field observations included debriefings of traffic surveyors as well as professional staff observations. Figure 2-10 identifies the primary areas where problems with queuing occur regularly. The following arterials and freeway ramps in the area have been observed to experience queuing delays:

- Eighth/Harrison/I-80 WB off-ramp;
- Ninth/Bryant/U.S. 101 NB off-ramp;
- Tenth/Bryant/U.S. 101 SB on-ramp;
- Mission/Duboce/Otis/U.S. 101 NB off-ramp;
- South Van Ness/U.S. 101 SB on-ramp;
- Fell/Laguna Central Freeway off-ramp; and
- Oak/Laguna Central Freeway on-ramp.

Eighth/Harrison/I-80WB Off-Ramp - This off-ramp has some congestion in the AM peak period. Queues of ten to twelve cars per lane were observed at various times from about 7:00 to 9:30 AM and at one point a queue of about fifteen cars in the right lane was observed. This can result in safety problems as the queue extends around the off-ramp curve reducing the reaction time available for drivers to see the queue as they exit the freeway. The short green time (14 seconds out of a 60 second cycle) for the off-ramp traffic allows only about seven to eight cars through per lane per cycle. Operations at this ramp are generally good, with little or no delay during weekends and the midday and PM peak periods on weekdays.

Ninth/Bryant/U.S. 101 NB Off-Ramp - This off-ramp experiences some congestion in the AM and PM peak periods with backups of ten to fifteen cars. While traffic operations are generally good at this ramp, traffic sometimes queues up midday. Some weekend congestion can also occur around noontime and when special events are held.

Tenth/Bryant/U.S. 101 SB On-Ramp - Heavy congestion often occurs at this off-ramp in the PM peak period. There are often PM peak queues developing as early as 3:00 PM on the Tenth Street approach. Queues can form up Tenth Street past Harrison Street when traffic is particularly heavy or when freeway congestion traffic backs up off of the on-ramp. On weekends traffic operations are generally good except from 3:00 PM to about 6:00 PM when some congestion usually occurs.

Mission/Duboce/Otis/U.S. 101 NB Off-Ramp - The off-ramp at this intersection is particularly busy in the PM peak period. Queues of over twenty cars or more per lane have been observed backing up on to the Central Freeway. Cars waiting in the shared right/through lane cause right turning (U.S. 101 NB) motorists to wait for the through signal green to reach the free right turn. This free right-turn lane is only about 100 feet long and becomes blocked when four or five cars queue at the STOP bar for the through movement across to Duboce Street. Since this right turn

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Figure 2-10
PRIMARY AREAS OF QUEUING IN THE STUDY AREA

WSA WILBUR SMITH ASSOCIATES

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carries all northbound U.S. 101 traffic, the blocking of this movement by the traffic waiting for the through traffic green light causes queues to form quickly. This conflict often causes heavy backups in the PM peak.

When queues at the Fell/Laguna off-ramp are long enough to become visible before the Mission Street exit, drivers divert onto the Mission Street exit to avoid long delays. The Mission Street off-ramp also carries considerable amounts of traffic during the midday, particularly from about 11:00 AM to 2:00 PM, although queues are generally no more than ten to fifteen cars. On weekends, and particularly Saturdays, there is generally heavy traffic from about 3:00 to 6:00 PM with average delays of about five to ten minutes.

South Van Ness/U.S. 101 SB On-Ramp - In the AM peak period congestion often occurs on southbound South Van Ness Avenue and also on eastbound Thirteenth Street as drivers compete for limited on-ramp capacity. In general, delays are not more than about five minutes except when there is congestion on the Central Freeway itself, which causes traffic to back up off the on-ramp onto the adjacent surface streets. This type of backup can also occur in the PM peak period when congestion on the James Lick Freeway spills over onto the Central Freeway. On particularly bad traffic days, traffic has been observed to back up on Thirteenth Street to Mission Street and also across Thirteenth Street on Howard Street and up South Van Ness Avenue. Southbound queues have been observed to extend up South Van Ness Avenue beyond Market Street. This situation frustrates drivers to the point where they appear to be more likely to block intersections while attempting to get past a traffic light. This undoubtedly contributes to the increased number of accidents along this corridor.

Fell/Laguna Central Freeway Off-Ramp - The Fell Street off-ramp experiences heavy congestion in the PM peak period. On average, it appears that the backup is about forty to fifty cars per lane in the PM peak period, with average delays of about five to ten minutes getting off the ramp. By about 3:30 on any typical weekday, it can be expected that a queue of thirty cars or more per lane will form, causing delays of three to five minutes. On some days queues have been observed to back up all the way past the Mission/South Van Ness off-ramp, causing delays of almost twenty-five minutes. When these large queues form at both the Fell and the Mission/South Van Ness off-ramps, the Central Freeway backs up onto the James Lick Freeway. This would be on a particularly bad day for traffic, which generally happens about once a week. Queues also form in the AM and midday period. Throughout the day queues of ten to twenty cars per lane have been observed to form and dissipate regularly. Queues also form on Fell Street east of the off-ramp as traffic attempting to access the Oak Street on-ramp from Gough Street must cross the off-ramp traffic at Fell and Laguna.

Oak/Laguna Central Freeway On-Ramp - This on-ramp is generally congested in the AM peak period (7:00 - 9:00 AM). The traffic signals adequately meter traffic in most situations. However, it can be expected that about once a week there will be more severe backups. These can be due to

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traffic backing up off of the Central Freeway onto Oak Street or Oak Street itself becoming overloaded, leading to delays of up to twenty minutes. Congestion can sometimes continue until almost 10:00 AM on these heavy traffic days. There is also congestion at this on-ramp in the midday and PM peak periods. Operations are generally smooth during the midday but can become heavily congested in the afternoon on bad traffic days. Traffic on the weekends does not usually generate any significant delays except around noontime when queuing sometimes occurs on Oak Street. During lighter traffic periods, on-ramp traffic often speeds down the hill towards the on-ramp raising safety concerns.

Van Ness Avenue - In the AM peak period there is significant northbound and southbound congestion on Van Ness and South Van Ness Avenues throughout the study area. Traffic is generally heavy enough to allow drivers to move no more than two or three blocks before being stopped by a signal. Northbound traffic is heavy around Market Street and Mission Street in the AM peak period. It was observed that traffic was sometimes backed up into the intersection at Market Street, temporarily blocking Market Street traffic until traffic began to move on Van Ness Avenue. This is partially due to the large amounts of motorists attempting to turn left onto either Hayes or Grove Streets. The left-turn movement at Hayes Street, in particular, often overflows the left-turn pocket. This traffic then blocks the left traffic lane, effectively reducing the through capacity to two lanes. Queues then spill over onto the south side of Market Street as three lanes of traffic attempt to get past the bottleneck formed at Hayes Street.

Left-turn queues also often overflow left-turn pockets at Geary, O'Farrell, Pine and Bush Streets, blocking a through traffic lane on Van Ness Avenue. Right turns were rarely observed to block through traffic movements except for short periods where pedestrians delayed right-turn movements. MUNI buses, however, were often observed delaying traffic in the right-most lane. There are some locations that were exceptions to the above generalizations. The southbound right-turns from Van Ness Avenue onto Pine and Geary Streets cause delays on Van Ness Avenue. Also, southbound right-turns from Van Ness Avenue onto Bay Street have been observed to delay southbound MUNI buses.

In the afternoon on Van Ness Avenue, traffic generally begins to get heavy between 2:00 and 3:00 PM Southbound traffic in the Civic Center area becomes congested as drivers attempt to access the freeway. Northbound traffic in this area also becomes very congested in the PM peak period. Weekend traffic can create significant delays on Van Ness Avenue. Traffic conditions on some Saturday and Sunday afternoons have been observed to be extremely heavy, resulting in significant delays along Van Ness Avenue.

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Freeway Ramp Capacities

Field observations and twenty-four hour machine counts indicate that all on-ramps currently operate at capacity during peak periods. The Oak/Laguna on-ramp operates at capacity during the AM peak period and the South Van Ness Avenue on-ramp operates at capacity during the PM peak period on Sunday. Table 2-8 summarizes estimated ramp capacities at the on-ramps and the time period during which the ramp operates at capacity.

Table 2-8
CENTRAL FREEWAY AREA ON-RAMP CAPACITIES

On-Ramp	Period During Which the On-Ramp Reaches Capacity	Ramp Capacity (Vehicles/Hour)
I-80 WB Seventh/Harrison	Weekday P.M. Peak	2,000
I-80 EB Eighth/Bryant	Weekday P.M. Peak	1,500
U.S. 101 NB Tenth/Bryant	Weekday P.M. Peak	1,100
U.S. 101 SB South Van Ness	Sunday P.M. Peak	1,700
Central Freeway Oak/Laguna	Weekday A.M. Peak	4,000

A summary of important PM peak hour volumes is presented in Figure 2-10. The existing PM peak hour volumes on the freeway on- and off-ramps in the Central Freeway area are shown in Table 2-9. Ramps at Oak/Fell Streets carry disproportionately high traffic volumes.

Table 2-9
SUMMARY OF CENTRAL FREEWAY RAMP VOLUMES

Off-Ramps	Average Daily Traffic	P.M. Peak Hour Volume
I-80 WB Eighth/Harrison	14,000	1,200
U.S. 101 NB Ninth/Bryant	15,300	1,200
U.S. 101 NB Mission/Van Ness	20,000	1,300
Central Freeway Fell/Laguna	47,000	4,300
On-Ramps	**Average Daily Traffic**	**P.M. Peak Hour Volume**
I-80 WB Seventh/Harrison	14,900	2,000
I-80 EB Eighth/Bryant	14,800	1,500
U.S. 101 NB Tenth/Bryant	14,100	1,100
U.S. 101 SB South Van Ness	22,000	1,400
Central Freeway Oak/Laguna	47,000	4,000

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CONGESTION MANAGEMENT PLAN MONITORING

The San Francisco Transportation Authority (SFTA) prepared a 1993 update to the S.F. Congestion Management Program (CMP). As part of this update, average speeds and levels-of-service are calculated for all roadways designated as part of the CMP network. The CMP-designated roadway network consists of all state highways and principal arterials. These CMP streets include:

- Van Ness Avenue and South Van Ness Avenue;
- Lombard Street;
- Franklin Street;
- Gough Street south of Pine Street;
- Oak and Fell Streets;
- Market and Mission Streets;
- The Central Freeway;
- I-80 and Highway 101 freeways;
- Howard and Folsom Streets;
- Third, Fourth, Fifth, Sixth, Seventh, Eighth, Ninth and Tenth Streets; and
- Duboce Street.

The Transportation Authority must make an annual finding of conformance with the CMP. The conformance finding affects the City's eligibility for the following funding sources: State Fuel Tax increment and Flexible Congestion Relief (about $25.6 million/year), Traffic System Management program, State Rail Bond Propositions 108 (about $174 million) and 116 (about $35 million) and Federal Surface Transportation Program and Federal Congestion Management and Air Quality program (about $11.4 million/year). The City presently uses most of these transportation funds for MUNI improvements not highway projects.

As part of the Central Freeway Areawide Traffic Study, travel time surveys were conducted along Van Ness Avenue and Lombard Street. A comparison of the average speeds developed for this study with those listed in the 1993 Update CMP showed a very close correlation of the average speeds along Van Ness Avenue in the AM, midday, and PM periods. Those speeds ranged between twelve and nineteen mph. However, along Lombard Street there appears to be some discrepancies between the different average speeds during the PM peak period. The CMP lists an average speed of twenty-one mph. for westbound Lombard during the PM peak period, with a level-of-service (LOS) of B. Central Freeway Study travel time surveys yielded an average speed of only 12 m.p.h. for PM westbound Lombard Street traffic. A run made in the later part of the PM peak period yielded an average speed of 24 mph but throughout most of the PM peak average speeds are significantly lower than 24 mph. Observations of queuing along Lombard Street indicate that the data collected in the Central Freeway Study travel time surveys are more representative of existing conditions. The LOS calculations prepared using recent traffic counts indicate that westbound

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Lombard Street traffic operates at LOS D in the PM peak period, rather than at LOS B as stated in the CMP.

In general, Central Freeway Study CMP Level-of-Service analyses are compatible with those of the CMP monitoring program. The data collected to a large degree validate the CMP Level-of Service monitoring results, which are presented in Figure 2-11. The only study area segments which the analysis indicates were not correctly represented in the CMP are Lombard Street between Franklin and Broderick Streets (should be shown as LOS D), and Gough Street between Grove and Fell Streets (should be shown as LOS D).

It is important to note that actions which result in the addition of new LOS F intersection and street segments risk loss of CMP associated transportation funds. Street segments which operated unacceptably (LOS F) in 1991 and which still operate poorly are exempt from CMP regulations. This latter category includes the Central Freeway, Van Ness Avenue, (Golden Gate Avenue to Thirteenth Street) and Duboce Street between Mission and Market Streets.

LIVABILITY

The principal focus of the Central Freeway Areawide Traffic Study was traffic movement. While the convenient and safe movement of traffic is an important contributor to economic vitality and to livability, traffic can adversely affect the environment and livability of neighborhoods. The present freeway structure is generally considered to be visually unattractive and it physically separates neighborhoods. Many users and residents are concerned about its structural safety and some local area residents believe that the areas underneath the freeway increase security problems.

SUMMARY

While some areas of the city have benefited from post-earthquake freeway removals, other areas have been adversely impacted. Motorists have suffered delays, and traffic congestion around the South Van Ness Avenue/Mission Street and Oak/Fell Street ramps and is a continuing problem. The increase in traffic accidents is also a major concern.

As discussed above, livability in the Central Freeway corridor is a major concern to residents, businesses and the city in general. Pedestrian, bicycle and traffic safety; parking; truck traffic; litter; noise; aesthetics and structural confidence are among many important livability concerns related to traffic in the corridor.

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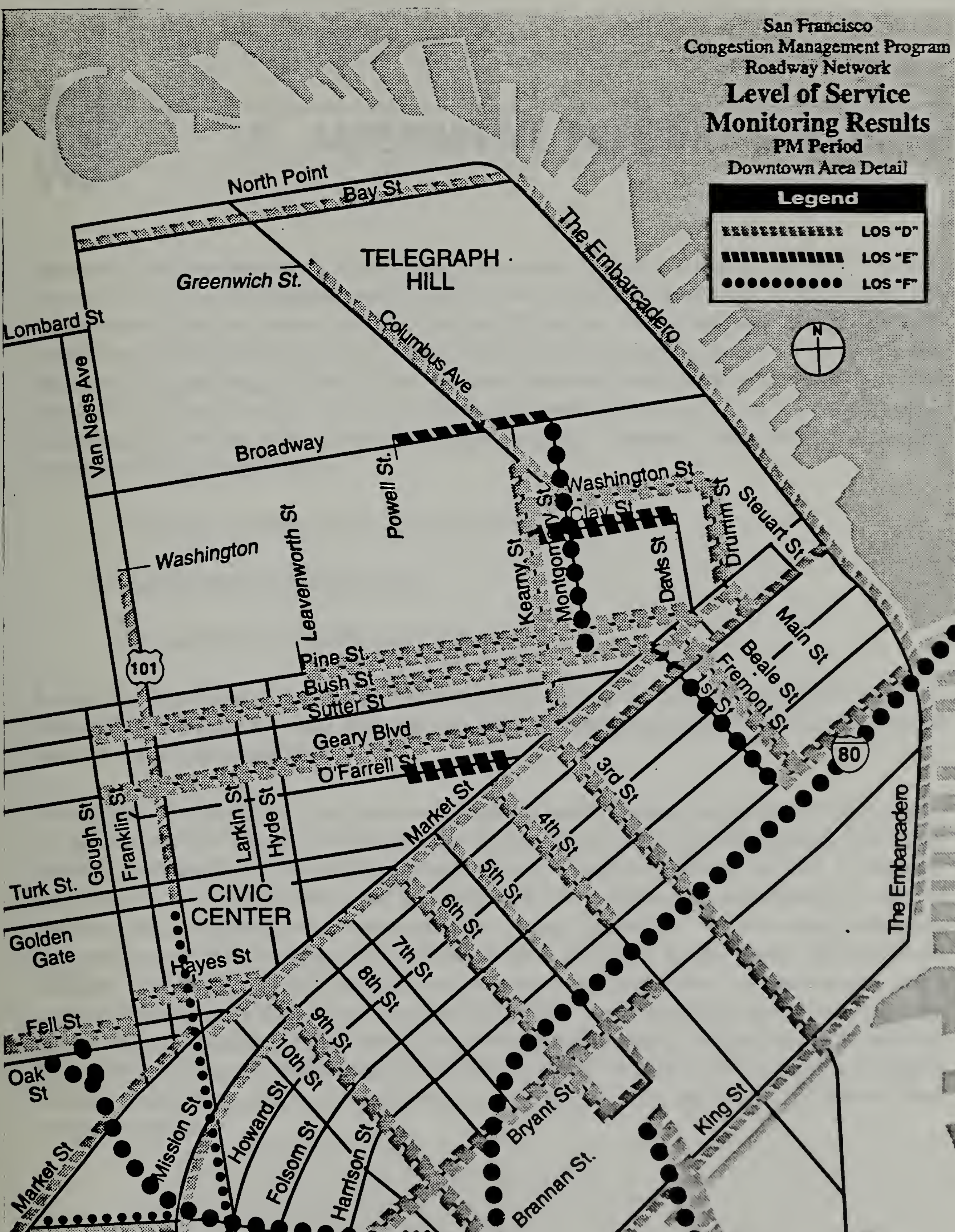

Figure 2-11
CONGESTION MANAGEMENT PROGRAM
LOS MONITORING RESULTS

3. ALTERNATIVE FREEWAY CONCEPTS

The most immediate and basic Central Freeway decision is whether or not to proceed with Caltrans' proposal to retrofit the existing freeway structure. As described in detail later in this chapter, this proposal would fix the northern terminus at Oak/Fell Streets and would retain the present high double deck crossing of Market Street. Some minor (as yet undefined) surface street circulation and operational changes might be possible, but the retrofit proposal would limit major opportunities for change. The retrofit concept, therefore, represents a baseline alternative and provides a useful benchmark for comparing other freeway access alternatives. Alternative concepts were defined in terms of three key traffic issues:

1. Northern Terminus of the Central Freeway;

2. Market Street Crossing(s); and

3. Surface Street Circulation and Operations.

Most traffic improvement concepts spill over into more than one of these three fundamental issues, nonetheless, they provide a clear and simple framework to define and evaluate the large number of possible improvement concepts.

Alternatives were identified from previous City and Caltrans planning studies, from field review of the corridor and by review of proposals developed by the Hayes Valley/Western Addition Task Force and also by individuals. Definitions of improvement alternatives initially focused on concepts confined to the immediate area around the Oak/Fell Streets ramp landings anticipating diversion of traffic to other neighborhoods would encounter strong opposition. As the study progressed, improvement concepts broadened to respond to goals expressed by the Hayes Valley/Western Addition Task Force. The full range of more than two dozen alternative concepts were narrowed to six concepts for more detailed assessment by this project. No concepts have been eliminated from possible future consideration. The purpose of narrowing the number of alternatives in this study was to provide preliminary findings in time for the City to decide whether or not to support continued Caltrans efforts to retrofit the Central Freeway or to quickly alter this course and pursue other promising options.

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Location of Northern Terminus Issues

The Board of Supervisors has resolved that no new above-ground ramps be built north of Fell Street. Three issues need to be addressed in evaluating the northern end of the Central Freeway.

- Ramp access capacity requirements and capacity consistency at the southern and northern ends of the Central Freeway. A longer freeway provides more opportunities for ramp access and therefore greater access capacity. For example, a single exit ramp for the entire Central Freeway would have extreme difficulty serving 136,000 ADT and by concentrating traffic on a single ramp would result in severe traffic impacts on immediate area local surface streets. The concentrated traffic impacts on Oak/Fell Streets resulting from the elimination of the Franklin/Gough ramps illustrates this consequence.

- What is the minimum freeway length required to minimize potential ramp capacity and weaving impacts on I-80 and the James Lick Freeway? This issue is also important if the present double-deck section of the Central Freeway is demolished to facilitate construction of single deck or other replacement concepts. The less stacking capacity provided on the Central Freeway, the greater the risk of disruptions to the I-80/James Lick freeway and for gridlock conditions on local San Francisco streets. Even today, stacking capacity on the Central Freeway sometimes proves insufficient. Expanding stacking capacity would help reduce spillover traffic impacts while lessening capacity would significantly increase spillover impacts.

- Is it possible or desirable to route 94,000 ADT across Market Street at-grade? This would represent about an 80 percent increase in Market Street crossing traffic between Duboce and Seventh Streets.

Market Street Crossing Issues

In addition to the present double deck crossing of Market Street, single deck, at-grade and subsurface crossings have been suggested as alternative concepts for the Central Freeway crossing of Market Street.

- Because MUNI Metro's tunnel is near the surface under Market Street, tunnel options apparently will need to go deep under Market Street. Aside from increased cost and perhaps construction period disruption of MUNI Metro tunnel operations, a deep tunnel will require steep grades and will limit/impact local street circulation options. Is it possible to design a geometrically safe tunnel under Market Street?

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- Crossing Market Street at-grade will impact MUNI and other traffic using Market Street. Should such a crossing concentrate northbound and southbound traffic, or disperse traffic flows in order to minimize impacts on Market Street?

- A single deck crossing of Market Street could be very low to the surface with perhaps special vehicle height restrictions for Market Street traffic, or could be higher up in order to overpass Haight Street. Aside from the height issue, a single deck crossing implies significant reconstruction (and traffic impacts) and will result in the widest freeway cross section crossing Market Street.

Surface Street Circulation and Operations Issues

- Which local streets should be used to link freeway ramps with major traffic corridors?

- Should traffic be dispersed or concentrated? Dispersal would impact more streets and be difficult to directionally sign, while concentration would continue the present practice of using designated major streets to carry most traffic.

- What improvements would be required to local streets in order to accommodate increased traffic? How appropriate would intersection grade separations (underpasses/overpasses) be or a new elevated structure along a new alignment? Would exclusive transit, high occupancy vehicle (HOV) and other lanes be required and would these further impact general traffic flow?

Approach to Defining Project Alternatives

Based on these issues, alternatives are organized for discussion into three general categories:

A. **Retrofit:** Those alternatives which retain the current double-deck Market Street overcrossing.

B. **South of Market:** Alternatives which terminate the freeway at a point south of Market Street.

C. **North of Market:** Alternatives which call for continuation of the freeway above Market Street, but on a different structure than the existing one.

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RETROFIT ALTERNATIVES

The California Department of Transportation (Caltrans) has plans to seismically upgrade the section of the Central Freeway between Mission Street and Oak/Fell Streets. A key issue is whether this effort should proceed and a secondary issue is how best to improve local circulation access if it does proceed. The retrofit alternative should be included in the options evaluated in the Central Freeway Areawide Traffic Study.

Caltrans Retrofit Proposal

Caltrans has prepared a proposal to retrofit the Central Freeway from Mission Street to the Fell and Oak ramps. The Central Freeway is composed of two different major structure segments. Between the James Lick Freeway (1-80) and Mission Street the single level structure was constructed of steel, whereas between Mission Street and the Fell/Oak ramps the two-level structure is reinforced concrete. The former segment between the Fell/Oak and Gough/Franklin ramps was also a two-level reinforced concrete structure. Retrofit improvements are planned for the steel structure segment in 1995, but the major retrofit effort focuses on the reinforced concrete section.

After the 1989 Loma Prieta earthquake, the segment of the Central Freeway north of the Fell off-ramp, leading to the Franklin/Gough Street ramps, was demolished. As part of this demolition, several columns under the Fell/Oak ramps had to be "jacketed" for additional structural support. Caltrans also started planning for the first phase of the retrofitting project which would bring the reinforced concrete section of the freeway up to minimum seismic safety standards until new design concepts for a second phase retrofit were developed and tested. During design and initial construction it was determined that the Phase 1 temporary bracing systems were expensive and would cause problems with the later phase retrofit and long-term maintenance. Upon the abandonment of the two-phase approach, more detailed and complex retrofit solutions had to be developed.

The current retrofit proposal would bring the Mission-Fell/Oak section of the freeway up to new seismic safety criteria, which were developed by Caltrans with advice from the California Earthquake Advisory Board. The current retrofit project would go beyond mere repair by strengthening the existing viaducts up to the current seismic design criteria, thereby providing a much higher resistance to future earthquakes than a simple repair of damaged columns. The strengthening would prevent collapse and significantly reduce major damage to keep these structures in service in the event of a maximum credible earthquake.

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The retrofit design has been tested at UC Berkeley and UC San Diego and approved by an independent peer review panel. The basic approach to the retrofit is to replace the outer five and six foot rectangular columns with new six or seven foot diameter round columns. Figure 3-1 illustrates what the proposed retrofit concept would look like crossing Market Street. The existing bent caps and footings would be strengthened and any inner columns would be jacketed with an elliptical structural steel shell.

The outside columns would be replaced by temporarily shoring the bridge structure, removing the existing column, and constructing the new column while maintaining traffic on the temporarily shored bridge. The shoring is designed to carry all of the applied loads and only one column in a structural frame, approximately 300 feet long, would he removed at any given time. Two lanes are planned to be maintained in each direction every day, however, there would need to be some lane closures at night. In general, one lane would remain open at night although there would be occasions when the entire viaduct would need to be closed. This construction strategy assumes some night time construction activity which would impact local residential areas.

The two freeway stubs (the Gough/Franklin stub and the Panhandle Freeway stub near Haight Street) would be removed as part of the retrofit project. The present high two-level structure would otherwise remain basically unchanged, except for the larger support columns and "jacketed" inner columns.

A detailed traffic operations plan to complement the structural improvements has not been defined and is not a part of the retrofit project. These operations issues include Highway 101 guide signing, truck path descriptions, and schemes to more efficiently disperse local traffic on San Francisco's street system.

Major concerns with this alternative are the acceptance of existing traffic impacts, view blockages, neighborhood livability and security impacts, structural confidence, and land use compatibility.

Modified Retrofit Concepts

Present access to and from the Oak/Fell Street ramps is not efficient from a traffic standpoint and its concentration of traffic is not acceptable to nearby residents. Traffic inefficiencies include indirect freeway traffic connections to the Gough/Franklin corridor and the crossing of Fell off-ramp traffic with Gough Street on-ramp traffic at the Laguna/Fell intersection. This crossing traffic conflict reduces ramp capacity and increases gridlock risks of on-ramp traffic blocking off-ramp traffic at the Laguna/Fell intersection.

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Figure 3-1
PHOTO DEPICTION OF CALTRANS RETROFIT PROPOSAL

Three modified retrofit concepts might improve present traffic conditions under the retrofit alternative:

1. Link the Fell Street ramp to Franklin Street via an underpass of the Oak Street on-ramp;

2. Reroute Gough Street traffic via a two-way Oak Street between Gough and Octavia Streets to a new underpass of the Fell Street ramp connection; and

3. Provide an on-ramp from Fell Street at Octavia Street to the Central Freeway upper deck and from the lower deck to Oak Street at Octavia Street.

Concept 1 would add an underpass exit lane for the Fell Street ramp (Figure 3-2). Central Freeway traffic bound for Franklin Street would approach Laguna Street using the left-hand traffic lane. About 200 feet from this intersection, Franklin Street traffic would diverge at a four percent grade and pass under the Oak Street on-ramp and then exit onto Oak Street. In order to be effective, the Franklin Street exit traffic would need to have an exclusive exit lane to avoid the Fell Street exit queue. Insufficient widths exist on the existing ramp to provide a full third traffic lane.

Concept 2 (Figure 3-3) would route Gough Street traffic to the freeway via Oak Street (two westbound lanes), underneath the Fell Street off-ramp and link with the present Oak Street on-ramp via a tight "U-turn" near Laguna Street. This concept would eliminate the crossing freeway traffic conflict at Fell and Laguna Streets by diverting on-ramp traffic to another path.

Concept 3 (Figure 3-4) would provide new ramp connections to the former Gough/Franklin ramp stubs. The lower level northbound off-ramp stub is at elevation 99 feet near Lily Street and the upper level southbound on-ramp is at elevation 123 feet near Lily Street. Ground level is about 55 feet above sea level. Thus, the upper level ramp would need to drop about 70 feet and the lower level deck would need to transition about 45 feet to reach local surface streets. Block lengths are about 340 feet or enough to transition 20 feet of vertical elevation per block. Thus, more than two blocks would be required to ground the lower deck and four blocks would be required to ground the upper level using an eight percent maximum ramp grade. Experience indicates that a maximum eight percent down-ramp is possible as well as a maximum nine percent up-ramp for freeway traffic. From a safety standpoint, a steep on-ramp at the beginning of a freeway might he viable, but steep off-ramps should definitely be avoided. Preliminary analysis indicates that neither stubs could be ramped to grade nearer than Hayes Street in the Octavia Street alignment or Franklin Street in an Oak Street alignment. The most viable option would appear to be connecting the Gough Street on-ramp traffic via a new direct 12 percent up-ramp from Fell Street and re-directing off-ramp traffic bound for Franklin Street via the Concept 1 linkage. The 12 percent on-ramp grade would exceed Caltrans' maximum ramp grade standard.

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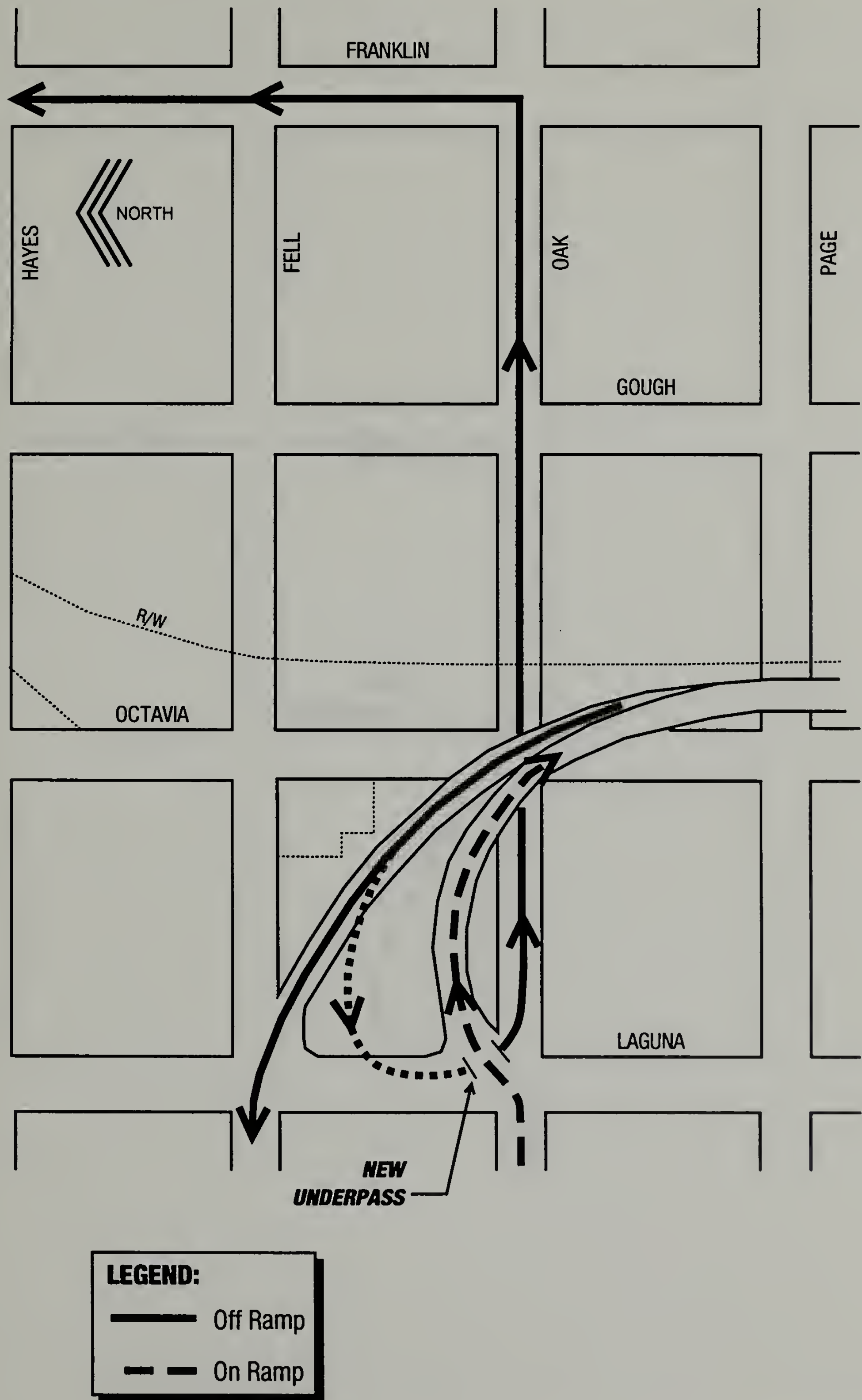

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Figure 3-2
RETROFIT CONCEPT 1

Figure 3-3
RETROFIT CONCEPT 2

Figure 3-4
RETROFIT CONCEPT 3

Major concerns with these modified retrofit concepts are effective mitigation of current traffic problems, view blockages, neighborhood livability and security, structural confidence, land use compatibility and traffic safety.

SOUTH OF MARKET ALTERNATIVES

A wide range of South of Market Street concepts were defined and discussed ranging from total removal of the Central Freeway back to I-80, to alternatives that have landings stubbing into Market Street. Principal concepts included:

- Total removal of the Central Freeway;
- South Van Ness Avenue/Mission Street Terminus;
- Direct ramps to/from South Van Ness Avenue;
- Gough/Franklin Corridor Link;
- Market Street Stub; and
- Twelfth Street exit.

Total Removal of Central Freeway

Questions raised during community meetings indicated interest in removing the entire Central Freeway all the way back to the I-80/James Lick Freeway. Important issues regarding this proposal include: access and convenience, the impact of traffic concentration on local street system, and implications on I-80/James Lick Freeway operations.

Recognizing that more than 94,000 motorists will want to cross Market Street (Oak/Fell ramp traffic plus Mission/South Van Ness ramp traffic bound for the Golden Gate Bridge), major improvements to surface streets will need to be carried across Market Street. Freeway ramps at Seventh, Eighth, Ninth and Tenth Streets presently serve 79,000 ADT. The addition of 136,000 more vehicles with the removal of the Central Freeway would result in a 215,000 total ADT (172 percent increase) to be served by these five ramps.

South Van Ness Avenue/Mission Street Terminus

The first set of Central Freeway ramps west of I-80/James Lick Freeways are the on- and off-ramps at South Van Ness Avenue and Mission Street. Traffic bound for the Bay Bridge (I-80) and Highway 101 presently enters the Central Freeway from local streets via a minimum 150-foot radius single-lane loop on-ramp. Off-ramp traffic is served by a two-lane direct ramp to the

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Mission/Otis/Thirteenth Street/Duboce Street intersection. Both the South Van Ness Avenue/Howard Street/Thirteenth Street and the Mission Street/Thirteenth Street/Otis Street intersections are very complicated, congested and high-accident locations. The safety problem often impacts traffic capacity.

Most alternative non-retrofit concepts would likely rely on a freeway shortened to Mission Street as an interim construction period freeway access. Figure 3-5 shows how traffic could operate if the Central Freeway were terminated at Mission Street. For interim construction period service it would be difficult to significantly improve either major ramp intersection, although extension of the Howard/Folsom Street one-way couplet south to Fourteenth Street would be possible. Potential interim improvements are further described in Chapter 5.

For the long-term, the two key ramp intersections (Thirteenth Street at Mission Street and at South Van Ness Avenue) could be grade separated, the two-lane off-ramp could be widened and a Mission Street direct on-ramp might be possible.

Major concerns involve adequate capacity for traffic crossing Market Street, traffic impacts concentrated around already congested ramp intersections, and adequate traffic storage to prevent spillover congestion onto both the I-80 mainline freeway and the South of Market surface street system.

South Van Ness Avenue Direct Ramp Concept

The South Van Ness Avenue Direct Ramp concept replaces the Oak/Fell extension with a new off-ramp to South Van Ness Avenue and a new direct on-ramp from Mission Street. This concept, shown in Figure 3-6, builds on the principle that Van Ness Avenue is the best linkage to the Golden Gate Bridge and northern areas of San Francisco. It is primarily a commercial street unlike Oak, Fell, Franklin and Gough Streets. Because South Van Ness Avenue and Van Ness Avenue can not be easily adapted to accommodate high volumes of left turns, Oak/Fell Street freeway traffic would access the freeway at Mission Street via the new Central Freeway corridor boulevard linkage.

This concept has four principal components.

1. Widening of the South Van Ness 150-foot radius loop on-ramp to provide two freeway entry lanes.

2. Replacement of the present Mission Street off-ramp with a direct ramp to northbound South Van Ness Avenue.

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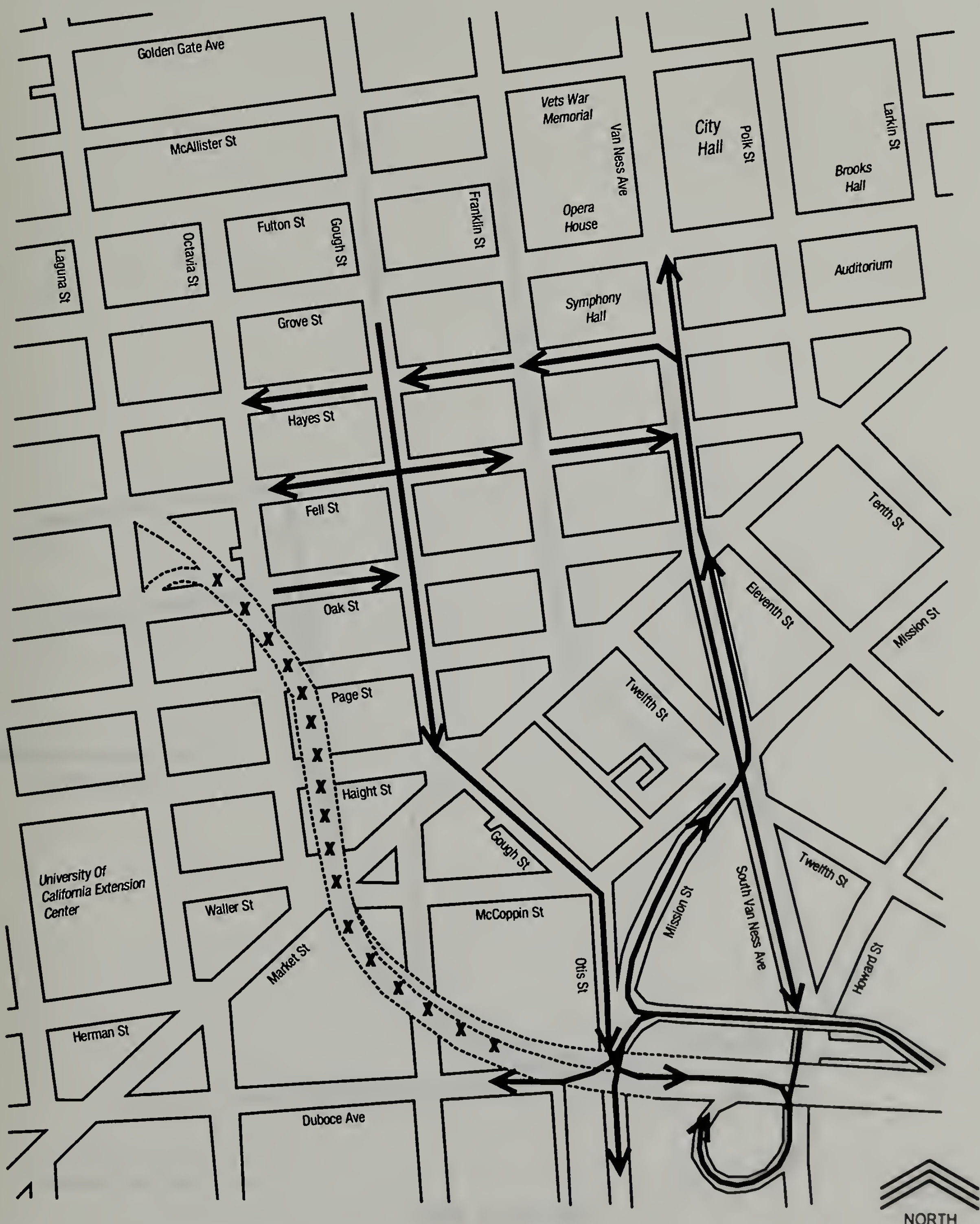

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Figure 3-5
MISSION STREET TERMINUS

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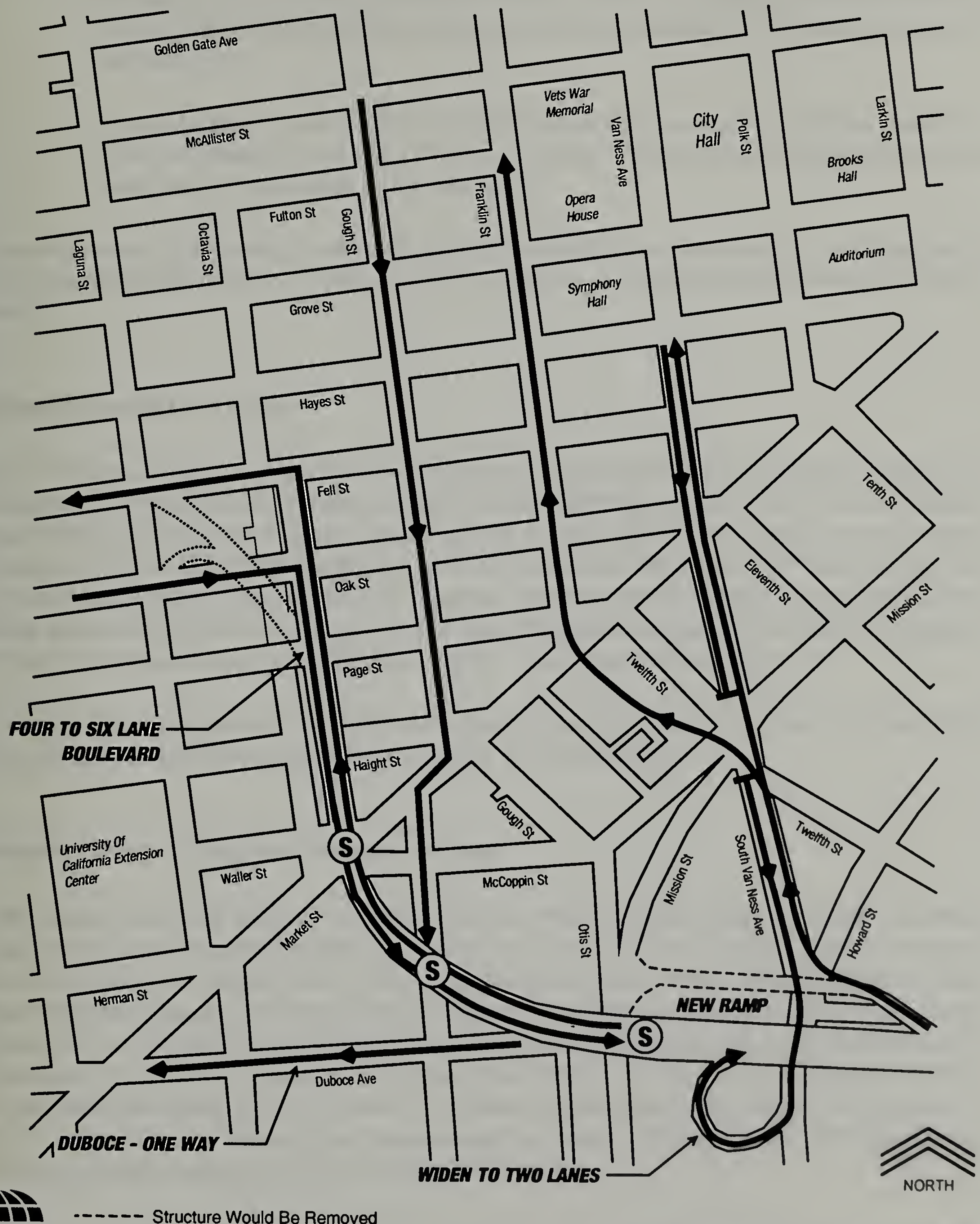

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Figure 3-6
SOUTH VAN NESS AVENUE DIRECT RAMP CONCEPT

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3. Replacement of the present linkage to Mission Street, the southbound and northbound lanes of the freeway would be brought down to grade at Mission Street using about a six percent grade.

4. Redevelopment of the Central Freeway right-of-way into a four to six lane boulevard between Mission Street and Fell Street. Duboce Street would be designated one-way westbound from Mission to Market Street.

Major concerns of this concept are the ability of Van Ness Avenue to accommodate additional traffic and impacts on MUNI service. Van Ness Avenue currently carries 60,000 ADT including 500 buses daily.

Gough/Franklin Links

This concept, as shown in Figure 3-7, would provide a northbound Central Freeway terminus at Franklin and Market Street by constructing an elevated off-ramp west of South Van Ness Avenue and coming down to grade at Market Street opposite from Franklin Street. Gough Street would be linked to the Central Freeway by a flyover connection from Otis Street near Thirteenth Street. The present Mission Street off-ramp would be retained. However, the South Van Ness Avenue loop on-ramp would be replaced with a direct on-ramp from Mission Street and the Central Freeway right-of-way from Mission Street to Fell Street would be redeveloped into a boulevard.

Concerns include intersection capacities along Market Street and public acceptance of a new 1,300 foot elevated freeway structure adjacent to South Van Ness Avenue.

Market Street Link to Octavia Street

This concept, shown in Figure 3-8, would retain the present Mission Street off-ramp and would upgrade the South Van Ness Avenue loop on-ramp to two lanes. The Market Street freeway stub would continue past Mission Street and go over Valencia Street where it would descend to meet Market Street at-grade. About a two-percent downgrade would be required between Valencia and Market Street. North of Market Street, the Octavia Street/Central Freeway right-of-way would be reconfigured to provide a Boulevard, perhaps six lanes wide, as far as Fell Street. Left-turns would be prohibited at Haight and Page Streets. A separate parallel local service road would be provided in the present Octavia Street right-of-way in order to provide driveway access. McCoppin Street would be closed between Valencia and Market Streets.

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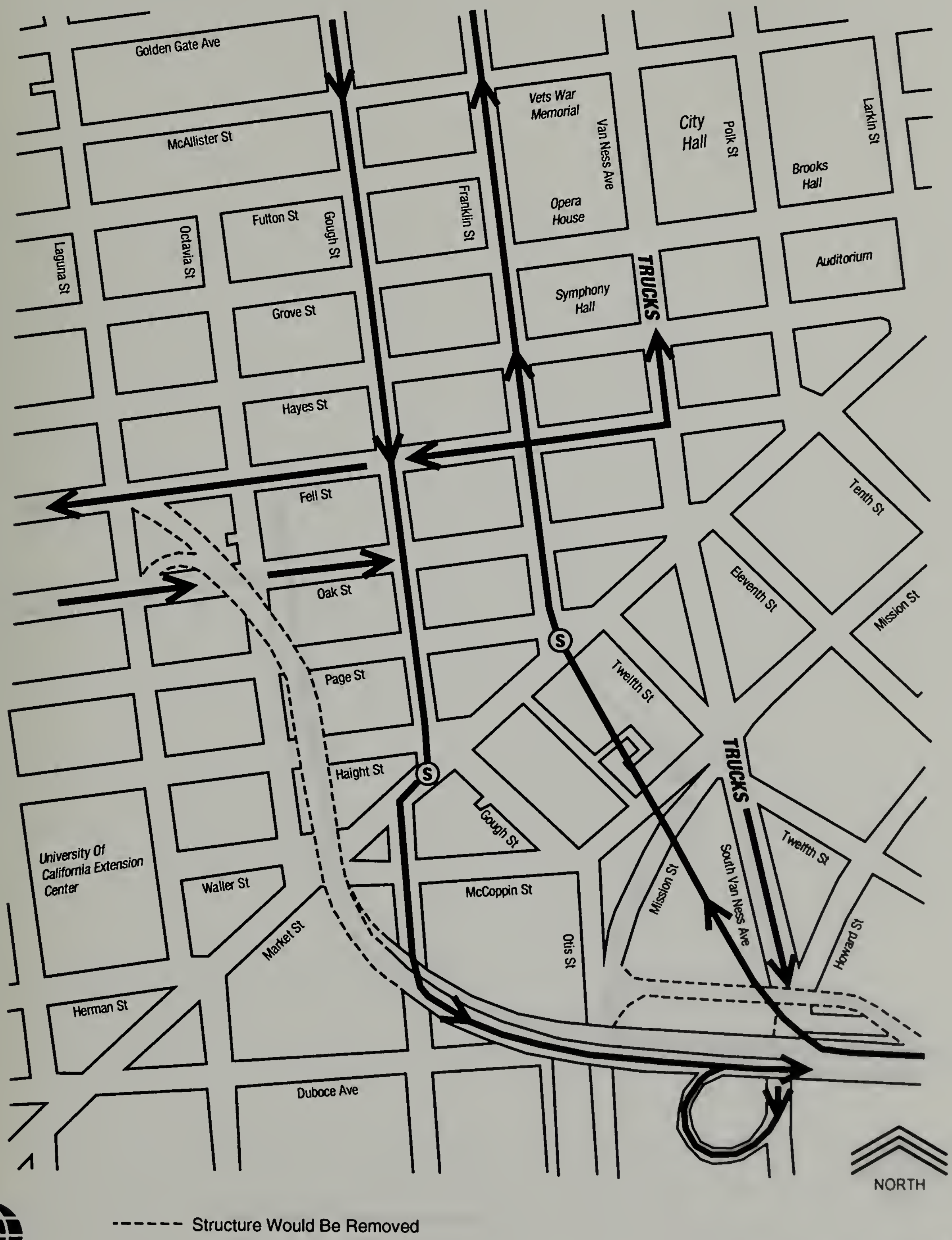

Figure 3-7

GOUGH - FRANKLIN LINK

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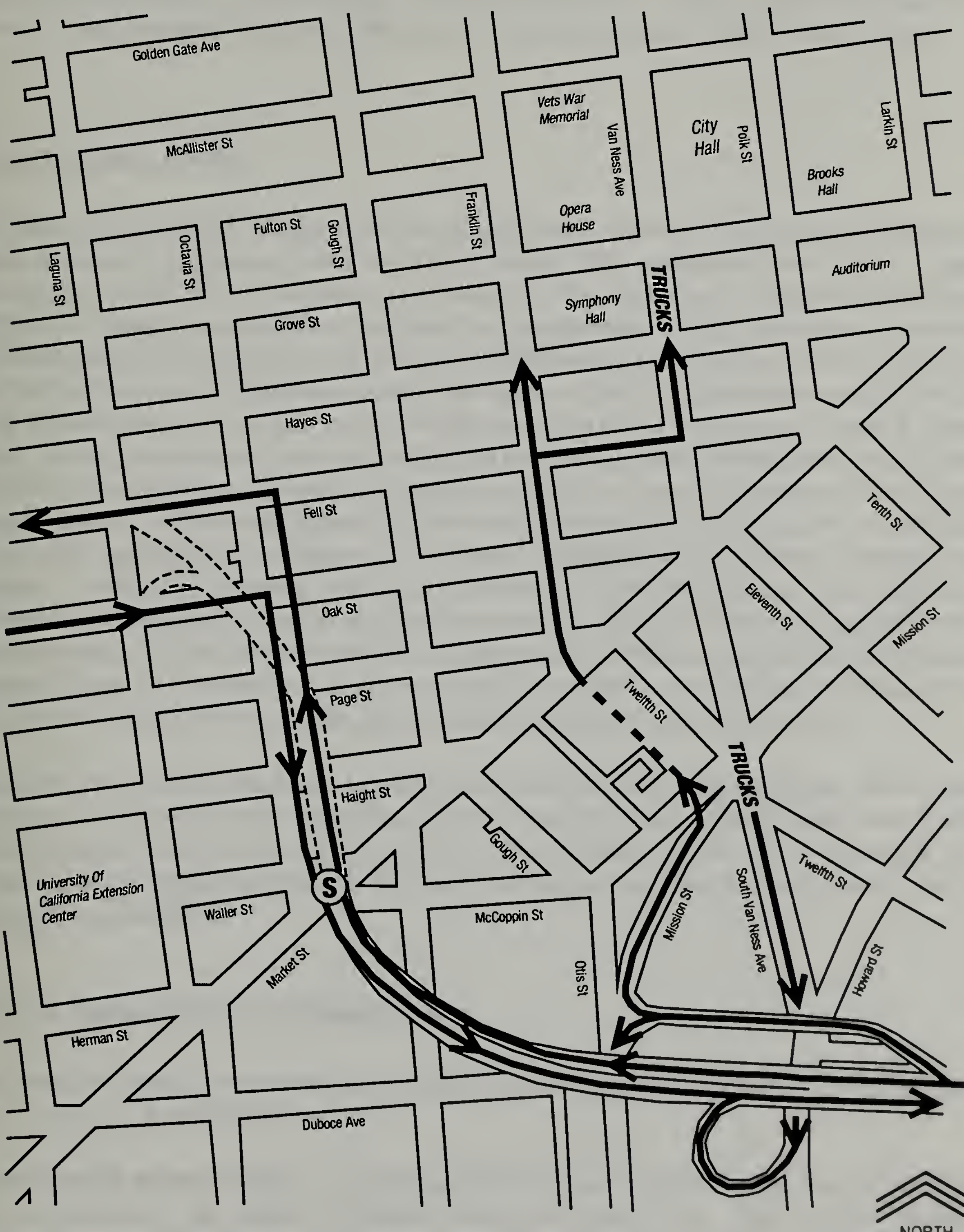

Figure 3-8

MARKET STREET STUB

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Major concerns include adequate surface street level capacity to crossing Central Freeway traffic demand across Market Street, and traffic related impacts along the Octavia Street corridor.

Twelfth Street Exit

The Hayes Valley/Western Addition Task Force suggested a number of alternatives for study which would terminate the freeway south of Market Street. The consultant team refined a single alternative to provide safe freeway weaving movements. The key features of this alternative, shown in Figure 3-9, derive from desires by the Task Force to eliminate as much of the freeway structure as possible and to orient traffic going north to Gough/Franklin and Van Ness Avenue rather than the Fell/Oak corridor. The freeway would come down to grade at Mission Street and a new exit ramp structure would be constructed on Twelfth Street that would come down to grade at Folsom Street. In order to eliminate a weaving problem on the freeway, traffic coming from the Bay Bridge would not be permitted to use the new Twelfth Street exit, but would use Mission Street to reach Franklin Street. Traffic from Highway 101 South would be directed to use the new Twelfth Street exit to reach Van Ness Avenue (Highway 101-Golden Gate Bridge) and to reach the Franklin/Gough corridor. Traffic from Highway 101 South bound for the Oak/Fell corridor, Mission Street or Duboce Street would be directed to the Mission Street exit. Figure 3-10 describes exit traffic flows for this concept. This alternative would have major at-grade crossings of Market Street at Duboce, Octavia, Gough and Franklin Streets. Grade separations would be constructed at the Mission/South Van Ness/Twelfth Street intersection and the Mission/Thirteenth Street intersection.

Major concerns include: adequacy of surface street traffic capacity crossing Market Street; public acceptance of a new elevated ramp along Twelfth Street; diversion of more traffic onto Twelfth Street; reduced traffic storage capacity on the Central Freeway; and safety of the branch ramp diverge point for traffic from Highway 101 South dividing into the Twelfth Street exit flow and the Mission Street exit flow.

NORTH OF MARKET ALTERNATIVES

The options for crossing Market Street other than at-grade include an underground tunnel, a single level deck and a double deck structure.

Tunnel Under Market Street - A major problem for tunnel options is the location of MUNI Metro's tunnel near the surface of Market Street (see Figure 3-11). The nine-foot clearance between the Market Street surface and tunnel envelope along the Central Freeway alignment is not sufficient to squeeze a freeway tunnel into even if the surface of Market Street could be raised

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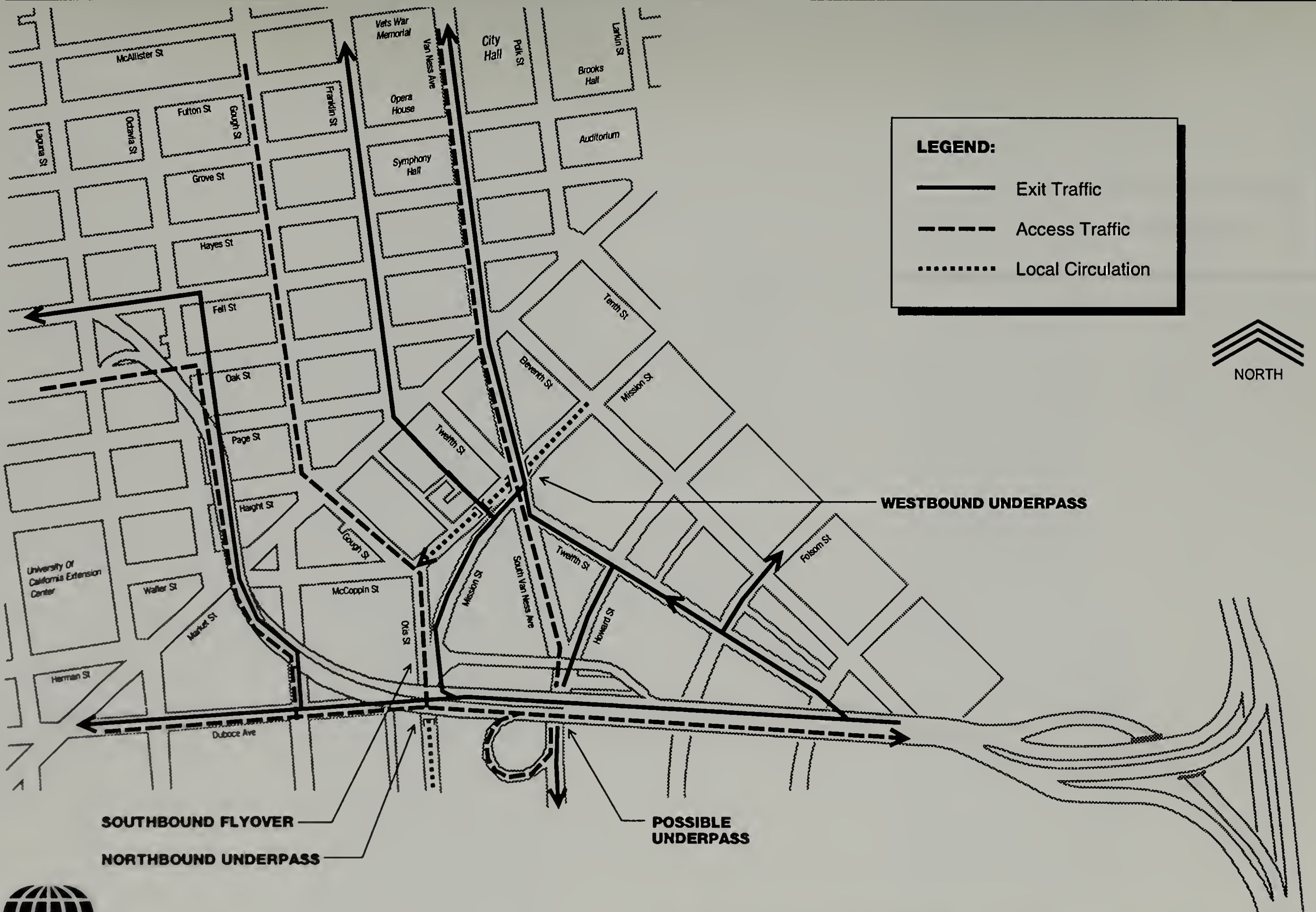

Figure 3-9
SOUTH OF MARKET FREEWAY TERMINUS - LOCAL ACCESS PLAN

Figure 3-10

SOUTH OF MARKET FREEWAY TERMINUS - AREAWIDE ACCESS PLAN

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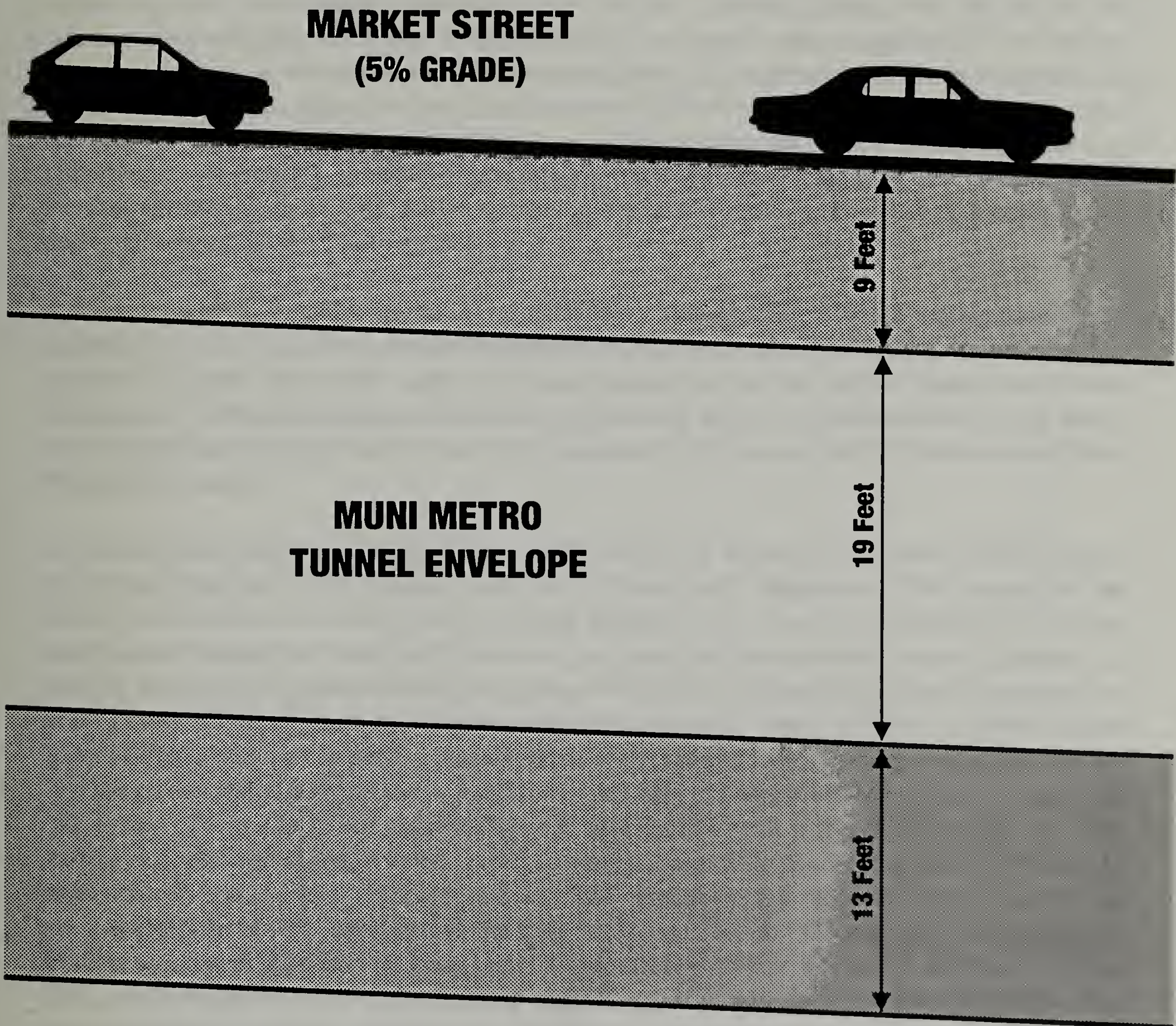

Figure 3-11

MARKET STREET PROFILE (AT CENTRAL FREEWAY RIGHT-OF-WAY)

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DF-FINALWKT-PRO-8/12/94C

several feet. Continued operation of streetcars (MUNI F line), property access, and visual concerns limit the amount Market Street could actually be raised. A freeway tunnel above MUNI Metro's tunnel generally would require about twenty-four feet of vertical depth, about 17 feet of height for traffic clearances and another combined seven feet for roadway support over MUNI and for structure supporting Market Street. It is possible that non-standard design approaches could reduce structural depth requirements and the the Federal Highway Administration and Caltrans might waive a foot or so for traffic height clearances, but real-world allowances for engineering design features (vertical curves, superelevation and utilities) would likely off-set any of these gains. Another very important consideration is the need to separate any freeway tunnel from the MUNI tunnel in order to maintain seismically independent structures and to avoid a nine to twelve month construction period closure of MUNI Metro service.

A freeway tunnel at Franklin Street was also explored. This alternative would require squeezing a roadway into the twenty foot envelope between Market Street and MUNI Metro. A tunnel at this location is possible only if the buffer area requirement between the MUNI tunnel and freeway tunnel can be addressed through non-standard engineering design. As reported earlier, this buffer area is important for seismic safety and for maintenance of continuous MUNI Metro service during freeway construction.

A freeway tunnel under the MUNI tunnel would need to be about 30 feet below MUNI in order to provide a desired 13-foot seismic buffer and 17-foot traffic clearances. This means that the freeway roadbed would be about sixty feet below Market Street. Figure 3-12 describes the terrain and present freeway deck levels in the corridor, but does not show this deep tunnel alignment. In order to tunnel under Market Street, the freeway would start descending towards the ground just west of Howard Street where it is approximately fifty-three feet above sea level. In order to pass under MUNI, about a seven percent downgrade would be required after passing over Mission Street. Because of the desire to resurface as fast as possible north of Market Street in order to connect to Oak Street, the profile of the Central Freeway would begin with a transition downgrade curve starting near Howard Street, a seven percent downgrade almost to Market Street, a low speed sag transition curve under Market Street and an eight percent upgrade to Oak Street. This would provide a very short level approach to the Oak Street intersection. Geometrically this scheme is relatively consistent with Caltrans design standards for freeway ramps, but not for mainline freeways. The sharp downgrade followed by the steep upgrade probably will not yield adequate traffic sight distance (subject to further assessment). Safe traffic sight distances are the distances motorists need to see, react and stop to avoid hitting obstacles on the roadway ahead.

Caltrans estimated the cost of a Central Freeway tunnel resurfacing at Grove Street to be $200-$300 million in 1991. Surfacing at Grove Street would almost certainly require the closure of Hayes Street crossing the Central Freeway right-of-way. A shorter tunnel surfacing at Oak Street would

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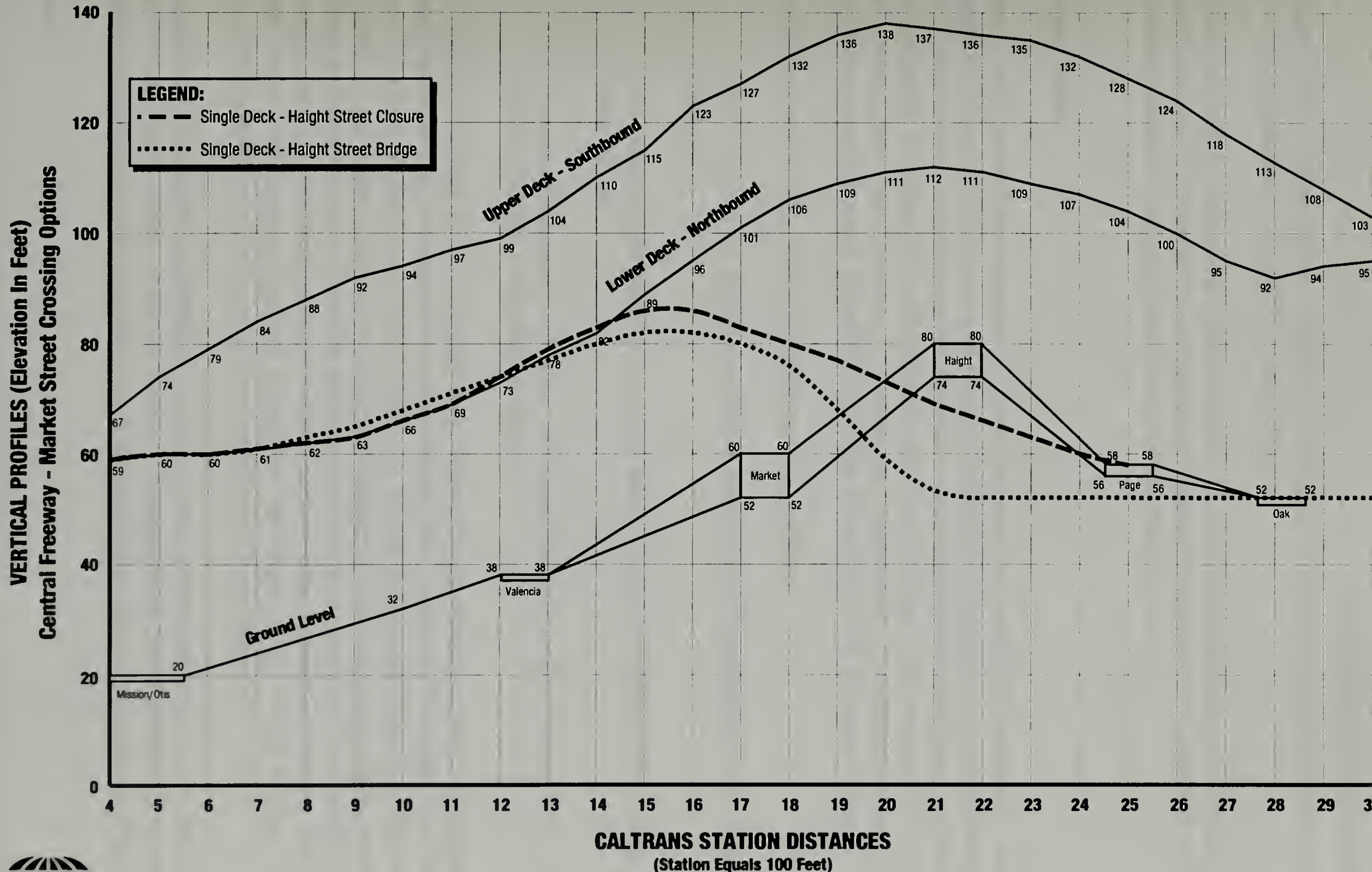

Figure 3-12
FREEWAY AND GROUND LEVEL ELEVATIONS

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probably cost about $200 million. While subsurface tunnels are themselves not visible, tunnel portals and ventilation shafts are unattractive tunnel features.

Major concerns with respect to a Central Freeway tunnel beneath MUNI Metro's tunnel include: the high cost and distance north of Market Street required to resurface the tunnel; and the ability to directly maintain a Central Freeway link to the Oak/Fell corridor.

Single Deck

A single deck "freeway" would need to be at least four lanes and possibly six lanes wide. Including shoulders, a barrier central median and six traffic lanes, the deck might be up to one hundred feet wide. Six lanes without shoulders would involve about a seventy-five foot wide deck and four-lane facilities would be about twenty-five feet narrower than six-lane cross sections. The present right-of-way for the Central Freeway is a minimum of 100-feet wide. Including the Octavia Street right-of-way, about 150 feet is generally available in the corridor north of Market Street.

Three single-deck crossings are, at least theoretically, possible:

- The current lower deck (45 feet above Market Street) remaining with the upper deck removed;

- The current upper deck (70 feet above Market Street) remaining with the lower deck removed; and

- Complete removal of both decks with replacement by a single deck at a lower level (about 20-25 feet above Market Street).

The current lower deck freeway is higher than required for any clearances, but at an appropriate height if the freeway is to continue elevated over Haight Street, which is 20 feet higher than Market Street. The existing upper deck is about 70 feet over Market Street, much higher than required for any clearance. The only potential advantage of retaining this deck is that it might be possible to maintain traffic on the upper deck while the lower deck is being demolished. The operational and structural viability of widening the upper or lower decks is being explored by Caltrans. The lower profile single deck, however, appears to decrease the visual impact of the freeway. Some right-of-way acquisition probably would be required near Valencia Street.

Single Deck - Haight Street Bridge - There are several profile options for a new lower single deck freeway ramp crossing of Market Street. As suggested by San Francisco Tomorrow, the freeway could descend under Haight Street after crossing Market Street and resurface at Page Street

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(Figure 3-13). Between Mission Street and Market Street, the freeway would rise at about a three percent grade, descend at a ten percent grade to Haight Street and then continue level to Oak Street. A concern of this concept is that is has somewhat of a "roller coaster" profile, a safety concern which would limit speeds to 30 MPH and the steep ten percent down grade. This concept, however, allows Haight Street to remain open. Page Street would be closed to improve highway geometry and eliminate freeway access traffic impacts on Page Street.

Single Deck - Haight Street Closure - A second concept would close both Haight and Page Streets to through traffic at Octavia Street and ramp directly down to Octavia Street near Page Street (Figure 3-14). The maximum ramp grade would be reduced to six percent and only one vertical curve change in direction would be required. No left-turns would be permitted on the "Octavia Boulevard" extension until Fell Street. At Fell Street, traffic could be accommodated at an at-grade intersection or the Fell Street left-turn could be accommodated with a direct flyover. While this concept closes both Page and Haight Streets, it provides a much better highway profile.

A key concern is whether closure of Haight Street at Octavia Street would be acceptable. Traffic presently using the one block segment of Haight Street between Market and Octavia Streets, including several MUNI routes, could be re-routed via Market and Octavia Streets to Haight Street.

New Double Deck Freeway

The principal advantages of a double deck freeway are that it minimizes right-of-way requirements and can facilitate "braiding" of ramp conflicts (i.e., vertically separating northbound and southbound ramp traffic movements). Disadvantages include visual impact and increased distance requirements for landing the upper deck. Higher roadway structures most probably would have greater noise impacts. Since landing distance is a major constraint, new double deck options are not proposed for further study.

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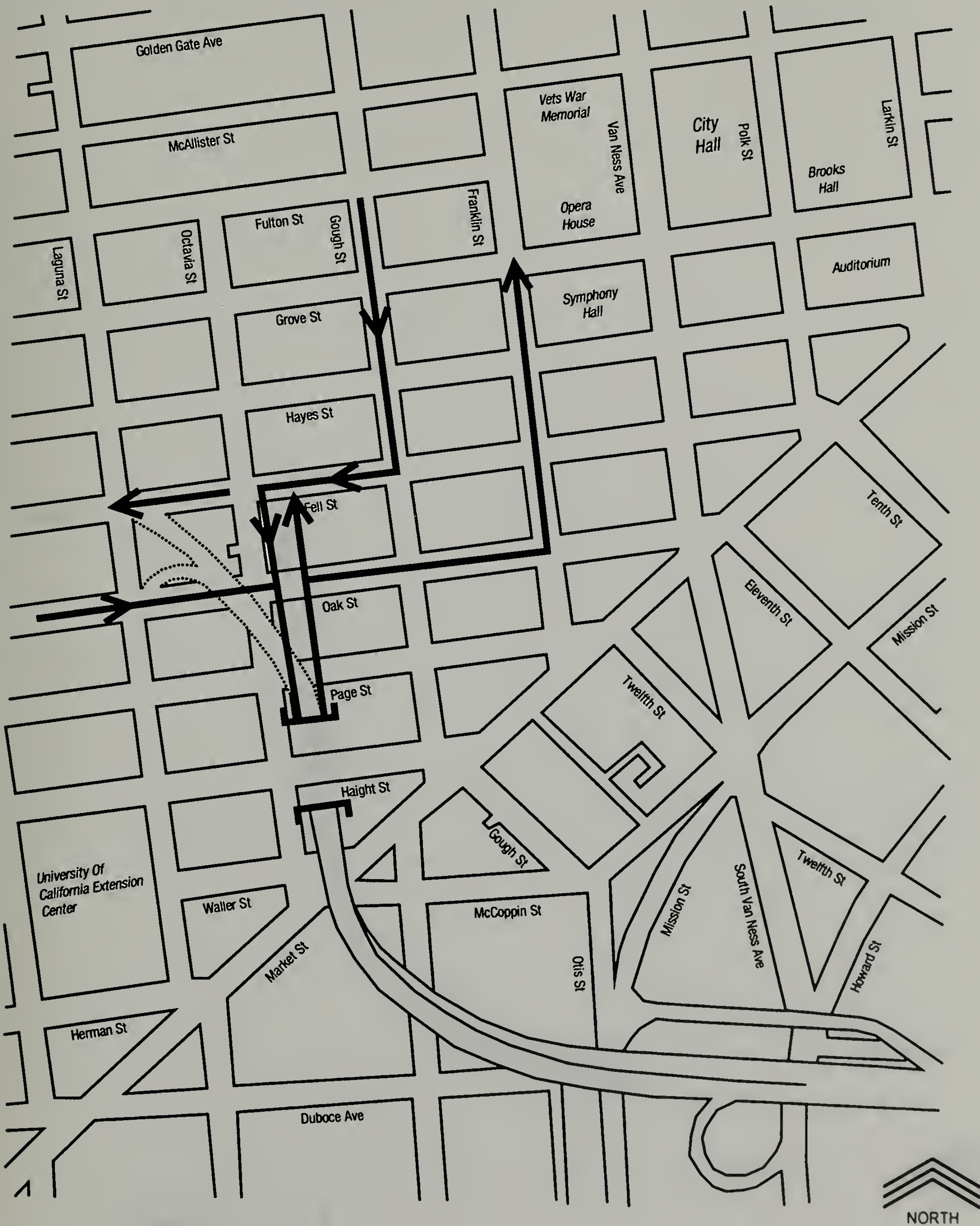

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Figure 3-13

SINGLE DECK - HAIGHT STREET BRIDGE

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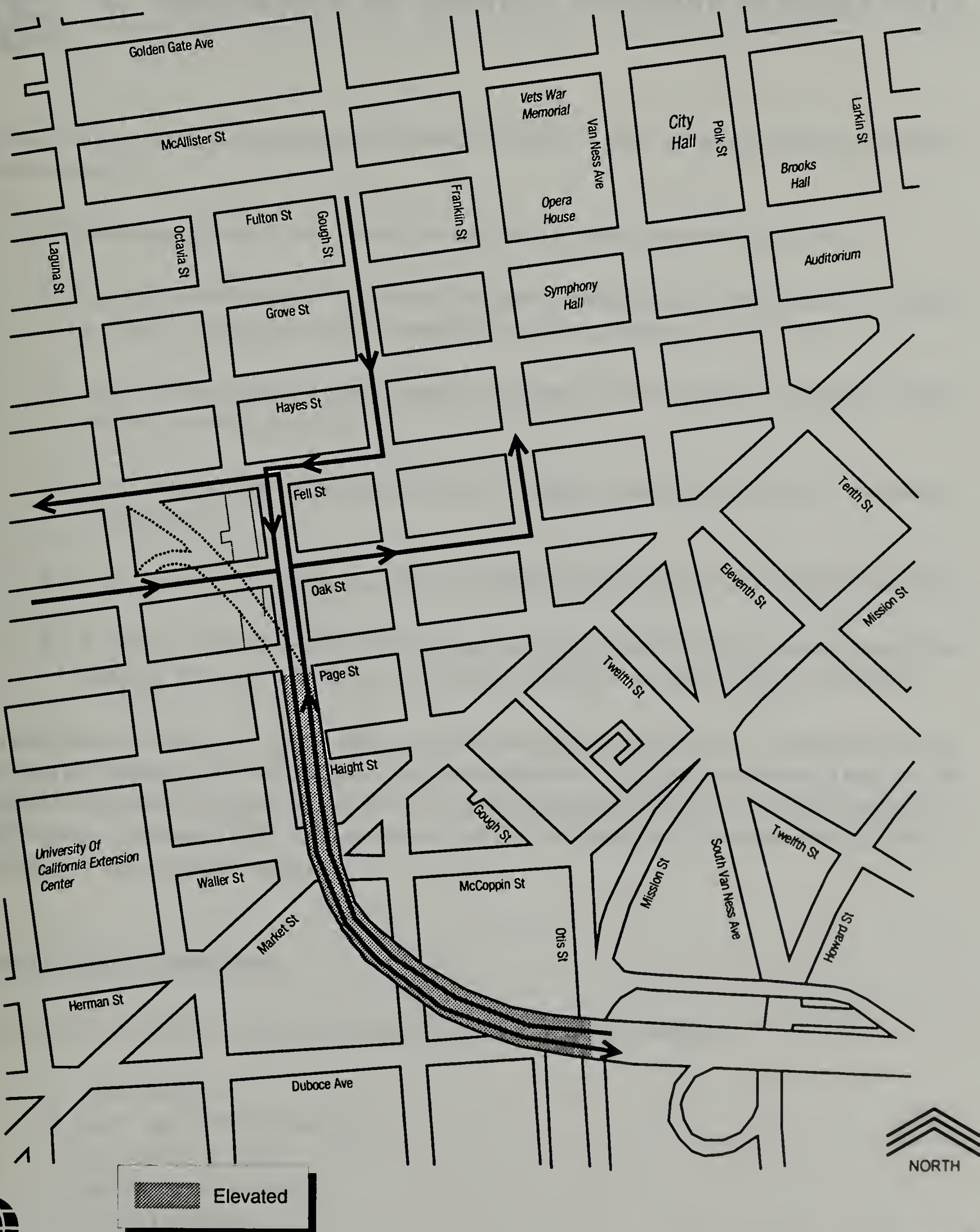

Figure 3-14
SINGLE DECK - PAGE STREET

4. EVALUATION OF CENTRAL FREEWAY ALTERNATIVES

The wide range of alternative concepts described in Chapter 3 were narrowed to six representative freeway strategies:

A. Structural retrofit of the present double deck freeway representing status quo;

B. A minor modification of this retrofit concept eliminating the traffic conflict at Laguna and Fell Streets by diverting Gough Street on-ramp traffic via Oak Street;

C. An interim construction period/possible long range concept which terminates the Central Freeway at Mission Street;

D. A low single deck crossing of Market Street underpassing Haight Street and terminating at Oak Street;

E. A variation of the above single deck crossing concept which closes Haight Street; and

F. A south of Market Street, Mission Street terminus concept which directly routes some Highway 101 exit traffic via a new Twelfth Street exit to South Van Ness Avenue.

This narrowing of alternatives is not intended to curtail further consideration of other alternatives described in Chapter 3, nor limit definition of new alternatives. Rather, the narrowing process was designed to efficiently focus project resources (dollars and schedule) on the key retrofit decision by analyzing a representative range of alternatives. Table 4-2 at the end of this chapter summarizes the evaluation of these six alternatives.

EVALUATION CRITERIA

Alternatives were assessed using the eleven criteria described in Chapter 1:

1. Visual Impacts;
2. New Right-of-Way Required;
3. Developable Land;
4. Neighborhood Impacts;
5. MUNI Impacts;
6. Traffic Congestion;

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7. Traffic Crossing Market Street At-Grade;
8. Design Safety and Geometry;
9. Construction Impacts;
10. Estimated Completion Date; and
11. Cost.

VISUAL IMPACTS

Three forms of visual impacts were assessed for the six alternative concepts:

- Market Street Perspective;
- Octavia Street Corridor Perspective; and
- South of Market Street Perspective.

The Retrofit (Alternative A) would maintain the present unsightly structure. The structural retrofit would widen some columns, and also remove the temporary shorings. Views up and down Market Street would continue to be obscured by the double deck structure whose upper deck is 70 feet above Market Street and whose lower deck is 45 feet above ground level. The unattractive 60 to 70 foot high structure would also dominate views along the Octavia Street corridor. South of Market Street would remain visually the same as today.

The Modified Retrofit (Alternative B) would have visual features similar to Alternative A. The new on-ramp connection would be visible from Laguna Street residences between Oak and Fell Streets (Figure 4-1). These residences would experience headlight glare impacts as well as daylight view impacts.

The Mission Street Terminus (Alternative C) would eliminate the double deck freeway crossing of Market Street and also the Octavia Street corridor elevated freeway segment. Thus, views would be open along Market Street and the abandoned freeway right-of-way north of Mission Street would be significantly improved visually. South of Mission Street, views would remain unchanged except for the presence of congestion.

The Single Deck with Haight Street Underpass (Alternative D) would have minimal view changes south of Mission Street. Between Mission and Market Streets, the lower and wider single deck structure would have mixed visual impacts. Crossing over Market Street, the 80 to 100 foot wide, 25 foot above ground structure would have significantly less view blockage than the present 70 foot high crossing (Figure 4-2). Between Market Street and Page Street, the freeway transitioning to a

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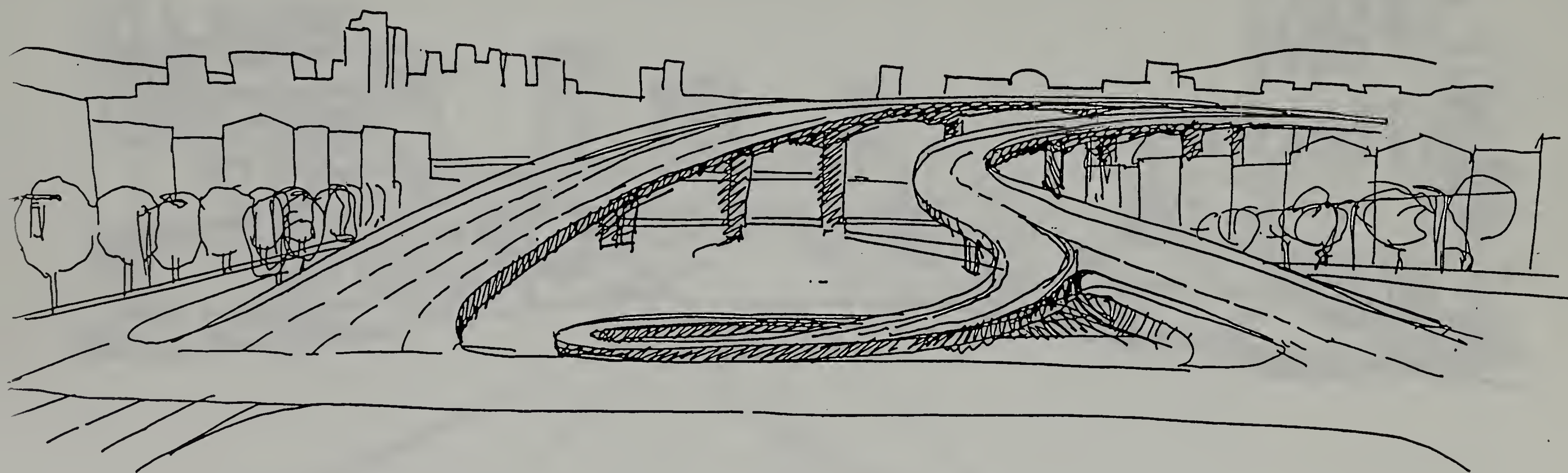
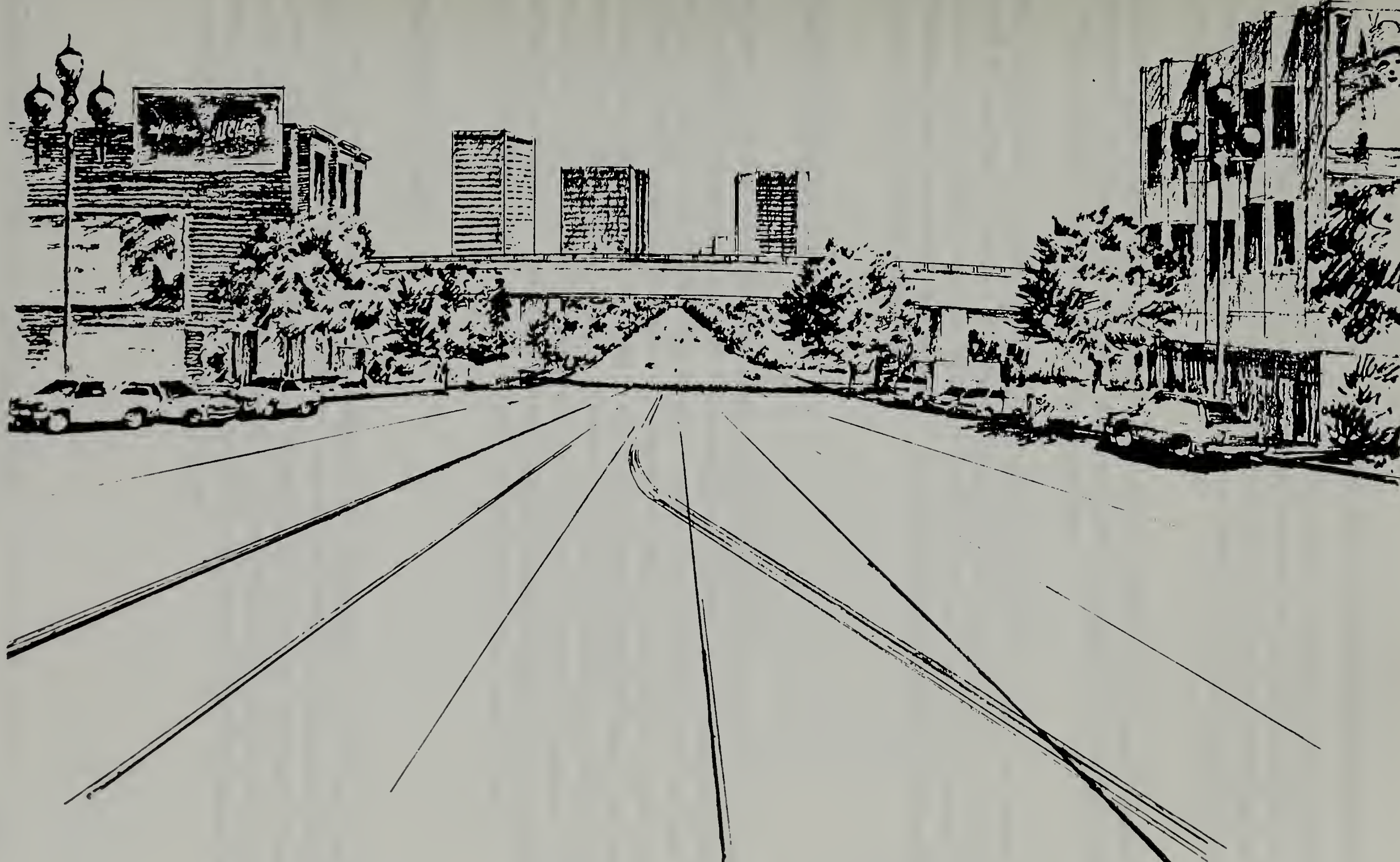


Figure 4-1
SKETCH OF MODIFIED RETROFIT

Prepared for Wilbur Smith Associates by Stevens & Associates



Prepared for Wilbur Smith Associates by Stevens & Associates

Figure 4-2
SKETCH OF LOW SINGLE DECK MARKET STREET CROSSING

parkway/boulevard would be partially obscured from the west (in a cut) and to a lesser extent from the east. Between Page and Fell Streets, the parkway/boulevard would itself be visible, but the present high structure would be removed, thereby improving views. Figure 4-3 illustrates how the view along Octavia Street might appear from Fell Street looking south toward Market Street and the new Haight Street bridge.

Single Deck Haight Street Closure (Alternative E) would have similar visual impacts as described for Alternative D. Because the parkway/boulevard would involve a shallower cut, it would be slightly more visible, particularly along Haight Street's view corridor.

South of Market Street - Twelfth Street Exit (Alternative F) would have similar view impacts as described for Alternative C within the existing Central Freeway corridor. The new 1,000 foot elevated exit ramp to Twelfth Street would impact views near Harrison and Twelfth Streets. The complementary grade separation improvements at the Mission Street intersection and South Van Ness Avenue would probably be unsightly.

NEW RIGHT-OF-WAY REQUIRED

Neither retrofit alternative (A or B) would require acquisition of additional right-of-way, nor would the Mission Street Terminus Alternative C. The two single deck Market Street crossing alternatives (D and E) probably would require additional right-of-way near Valencia Street in order to accommodate a wider structure. This need depends on the design speed adopted, superelevation (tilt), the need to provide shoulders as well as traffic lanes and the length of merging and queue bypass lanes used in the roadway's design. Alternative F (South of Market Street-Twelfth Street Exit) would require the acquisition of the parcel at the south end of Twelfth Street adjacent to the freeway and the acquisition of right-of-way between Otis and Market Streets in order to provide a linkage to Franklin Street. About 1.2 acres would be involved in the Alternative F concept.

DEVELOPABLE LAND

All six of the alternatives would allow development of the right-of-way of the former Central Freeway north of Fell Street. Except for Alternatives A and B, the retrofit concepts, the alternatives would provide additional land for potential new development. The single deck alternatives free-up Caltrans' 2.6 acre right-of-way on the block bounded by Oak, Octavia, Fell and Laguna Streets. Both South of Market Street alternatives (C and F) would free-up additional Central Freeway right-of-way from Mission Street to Fell Street (about 8.8 acres).

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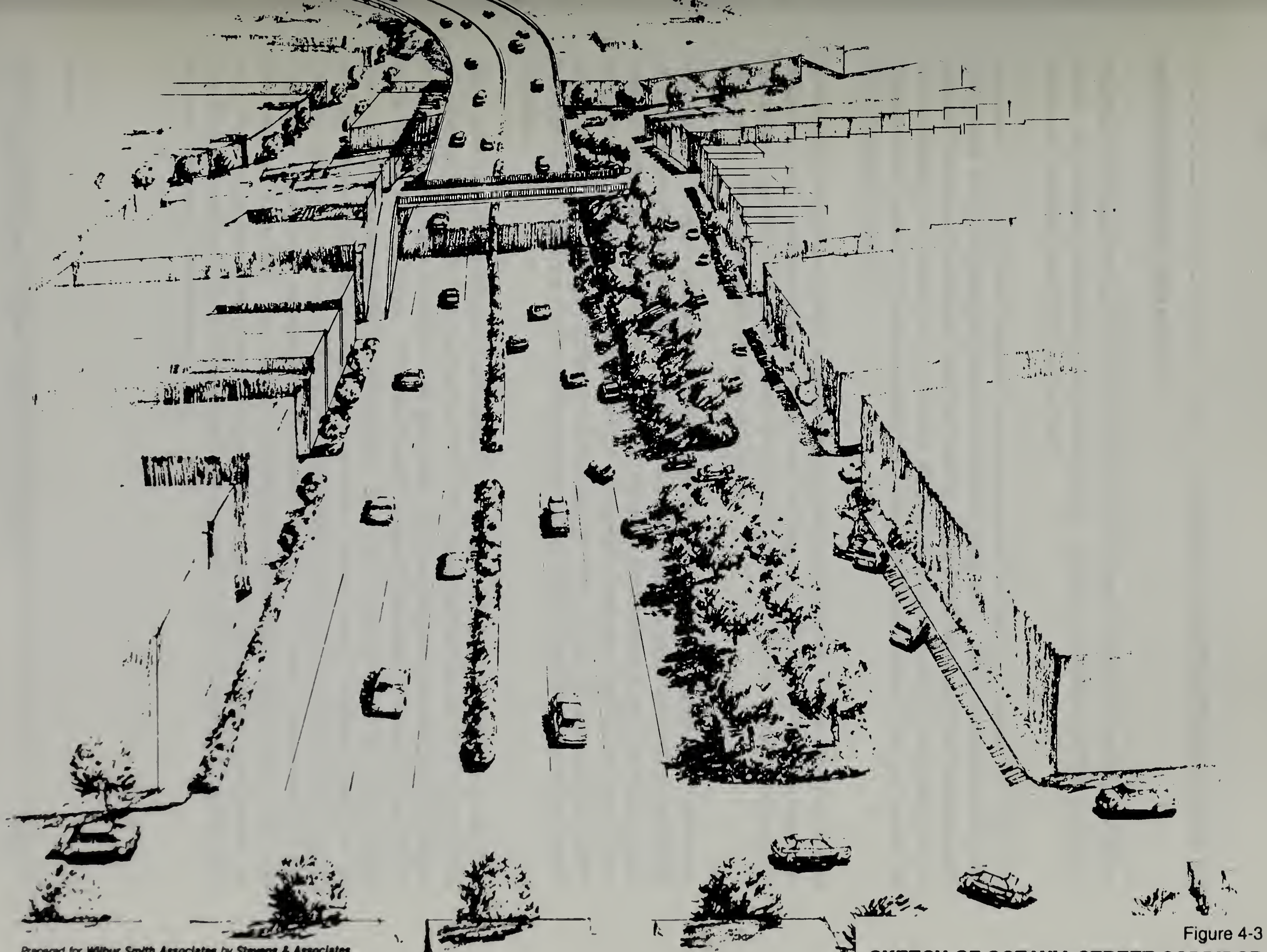

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Figure 4-3
SKETCH OF OCTAVIA STREET CORRIDOR

NEIGHBORHOOD IMPACTS

Neighborhood impacts include a variety of qualitative livability factors which are subject to individual values. Key aspects considered in this report include: physical and traffic barriers, pedestrian movement, parking, noise, safety and aesthetics.

Alternative A (retrofit) would maintain the status quo condition which is commonly viewed by local residents as a major blighting influence in the Hayes Valley area. The revitalization of the area north of Fell Street after the removal of the Central Freeway Franklin/Gough Street ramps supports this assessment. The present freeway structure north of Market Street results in a physical barrier, a visual barrier and is felt by some residents to attract criminal activities to the area under the elevated freeway structure.

Alternative B would have similar neighborhood impacts as described for Alternative A. The main difference is the relocation of some traffic from Fell Street onto Oak Street and two way traffic operations on the block of Oak Street between Gough and Octavia Streets. Curb parking would be eliminated on both sides of the street on this block.

Mission Street Terminus (Alternative C) would significantly improve the neighborhood environment north of Market Street by eliminating the elevated freeway structure. Increased surface street traffic between Market and Fell Streets, however, will result in congestion and increased accident potential. These impacts could spill over onto low volume residential streets like Page Street, Laguna Street and Octavia Street affecting pedestrian circulation, and increasing noise. The area near the Mission Street and South Van Ness Avenue freeway ramps, will experience significant worsening of traffic congestion.

Single deck Market Street crossing alternatives (D and E) would replace the physical double deck structure barrier along the Octavia Street corridor with a barrier of high volume surface street traffic. Thus, the Octavia Street corridor would gain more light and openness, but pedestrian circulation would become more restricted. With Alternatives D and E, pedestrian crossings of the Octavia Street corridor would be prohibited at Page Street. Alternative E would restrict pedestrian crossings at Haight Street. Some surface street noise and view impacts could be mitigated within the full corridor right-of-way, but others could not. By landing the elevated freeway structure south of Haight Street, the present nuisance and crime attractions under the elevated freeway along Octavia Street would be decreased. The lower and wider single deck crossing of Market Street could result in an even more pedestrian-unattractive environment along Market Street beneath the freeway. An urban design solution to this problem needs to be pursued. South of Market Street some views might be improved by the lowered freeway.

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Alternative F would have similar impacts north of Market Street as described for Alternative C. The principal impacts south of Market Street would be along Twelfth Street which would have narrowed sidewalks, major increases in traffic volumes and a new elevated ramp near Harrison Street.

MUNI IMPACTS

The San Francisco Municipal Railway (MUNI), Golden Gate Transit and SamTrans provide transit service through the Study Area.

Alternative A (Retrofit) would not affect existing transit services. The worst existing delays occur along South Van Ness Avenue and Mission Street.

Alternative B (Modified Retrofit) would have virtually no new impacts on transit other than on MUNI Route 16X, which would be slightly impacted by two way traffic operations on Oak Street.

Alternative C (Mission Street Terminus) would not require any MUNI reroutings but would significantly affect running times, operating costs and schedule reliability due to increased traffic congestion. In addition to Van Ness Avenue lines 42, 47 and 49 and Mission Street lines 14, 14L and 26, other lines affected would include the 19 Polk, 9 San Bruno, 12 Howard, 6 Hayes, 7 Haight, 66 Quintara and 8 Market. SamTrans routes using the Ninth and Tenth Street ramps would also be affected.

Alternative D (Single Deck-Haight Street Bridge) would require MUNI to reroute the westbound Routes 6, 7, 66 and 71 off of Page Street onto Market and Octavia Streets. This would require modifications of MUNI's trolley wire overhead. Numerous lines would be impacted during construction.

Alternative E (Single Deck-Haight Street Closure) would require the eastbound and westbound MUNI lines 6, 7, 66 and 71 to be rerouted via Market and Octavia Streets. Construction period MUNI service operations would be similar to Alternative D.

Alternative F (Twelfth Street Exit) would have impacts similar to those described for the Mission Street Terminus alternative (Alternative C).

TRAFFIC CONGESTION

As described in Chapter 2, traffic conditions in the Study Area reach poor levels during peak demand periods but, except for isolated locations near freeway ramps and on the Central Freeway

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itself, gridlock is not a common occurrence. As reported in Chapter 2, traffic volumes to the northern portion of the City have not decreased since the Loma Prieta earthquake. Traffic has diverted to other freeway ramps and surface streets. Nevertheless, traffic volumes might decrease in the long range future due to a redistribution of travel patterns or increased transit usage. Absent evidence for reduced traffic demand, the traffic analysis assumed maintenance of present traffic demand levels.

Analysis of 42 key intersections (Figure 4-4) for the afternoon peak traffic hour indicates that all six alternative freeway concepts would result in about six to seven intersections operating at their maximum capacities (LOS E). The principal differences between alternatives is the number of intersections which are projected to operate beyond their respective capacities. These LOS F intersections indicate potential for gridlocked surface street traffic operations. For example, present LOS F conditions on the Central Freeway stacks traffic into a number of key surface street intersections and results in spillover congestion. A single LOS F intersection can adversely affect traffic at adjacent intersections. The greater the number of LOS F intersections, the greater the potential for systemwide failure of the surface street system (gridlock).

The Retrofit and Modified Retrofit concepts (Alternatives A and B) are projected to maintain one LOS F intersection of the 42 Study intersections. The two single deck Market Street crossing concepts add one more LOS F intersection. The Mission Street Terminus concept is projected to result in ten LOS F intersections, which is nearly a quarter of the study intersections. The Twelfth Street Exit concept reduces the number of LOS F intersections from ten to eight by complementary intersection improvements at Mission Street intersections with South Van Ness Avenue and Thirteenth Street.

In essence, this analysis indicates that severe traffic problems could result if the Central Freeway is terminated south of Market Street and traffic demand remains constant. The single deck crossings of Market Street are projected to yield slightly worse traffic conditions than presently exist. Aside from the traffic consequences, south of Market Street alternatives would put the City at risk of losing CMP funding resources (see page 2-22). CMP network streets forecast not to meet CMP LOS standards for the Mission Street Terminus concept are:

- Market Street-Ninth Street to Duboce Street;
- Gough Street-Oak Street to Market Street;
- Franklin Street-Fell Street to Market Street;
- Oak Street-Octavia Street to Franklin Street;
- Mission Street-Ninth Street to Thirteenth Street; and
- South Van Ness Avenue-Market Street to Thirteenth Street.

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Figure 4-4
KEY STUDY INTERSECTIONS

TRAFFIC CROSSING MARKET STREET AT-GRADE

At present, a total of 10,800 vehicles per hour (VPH) cross Market Street at-grade during the afternoon peak traffic hour between Duboce Street and Eighth Street, as shown in Figure 4-5. This compares to a total volume of 5,000 VPH in both directions which use the elevated Central Freeway during this hour. In general about 2,000 VPH can be served by a single freeway traffic lane versus only 500 to 600 VPH for a surface street traffic lane across Market Street. This reduced capacity for surface streets is primarily due to sharing traffic signal green time with traffic on Market Street and the irregular alignment of most Market Street intersections.

Alternative A (Retrofit) would not change the amount of traffic crossing Market Street at-grade. The Modified Retrofit (Alternative B) also is not forecasted to reduce surface street traffic crossing Market Street as shown in Figure 4-5. The two alternatives which terminate the Central Freeway south of Market Street (B-Mission Street Terminus and F-Twelfth Street Exit) would increase surface street traffic crossing Market Street about 80 percent during the PM peak hour. The net traffic increase of 8,000 VPH crossing Market Street, assuming no drop-off in traffic demand, would translate to about 14 new lanes of surface street capacity. The two single deck Market Street crossing alternatives are forecast to reduce surface street traffic volumes crossing Market Street from 10,800 VPH to 9,500 VPH during the afternoon peak hour. Reduction of traffic crossing Market Street on surface streets is projected to occur due to improved Central Freeway linkages to the Gough/Franklin corridor.

DESIGN SAFETY AND GEOMETRY

Safety is perhaps the single most important consideration in the design of highway facilities. Safety is important for traffic reliability purposes as well as for personal well being. Key features of highway design which affect safety include:

- Curvature of roadways relative to traffic speeds and sight distances;
- Crest and sag vertical curves which also are determined by design speeds and safe sight distances[1];
- Maximum grades;
- Distances between decision points for motorists;

[1]Vertical curves at top of hills are referred to as crest curves while bottom of hill curves are called sag curves.

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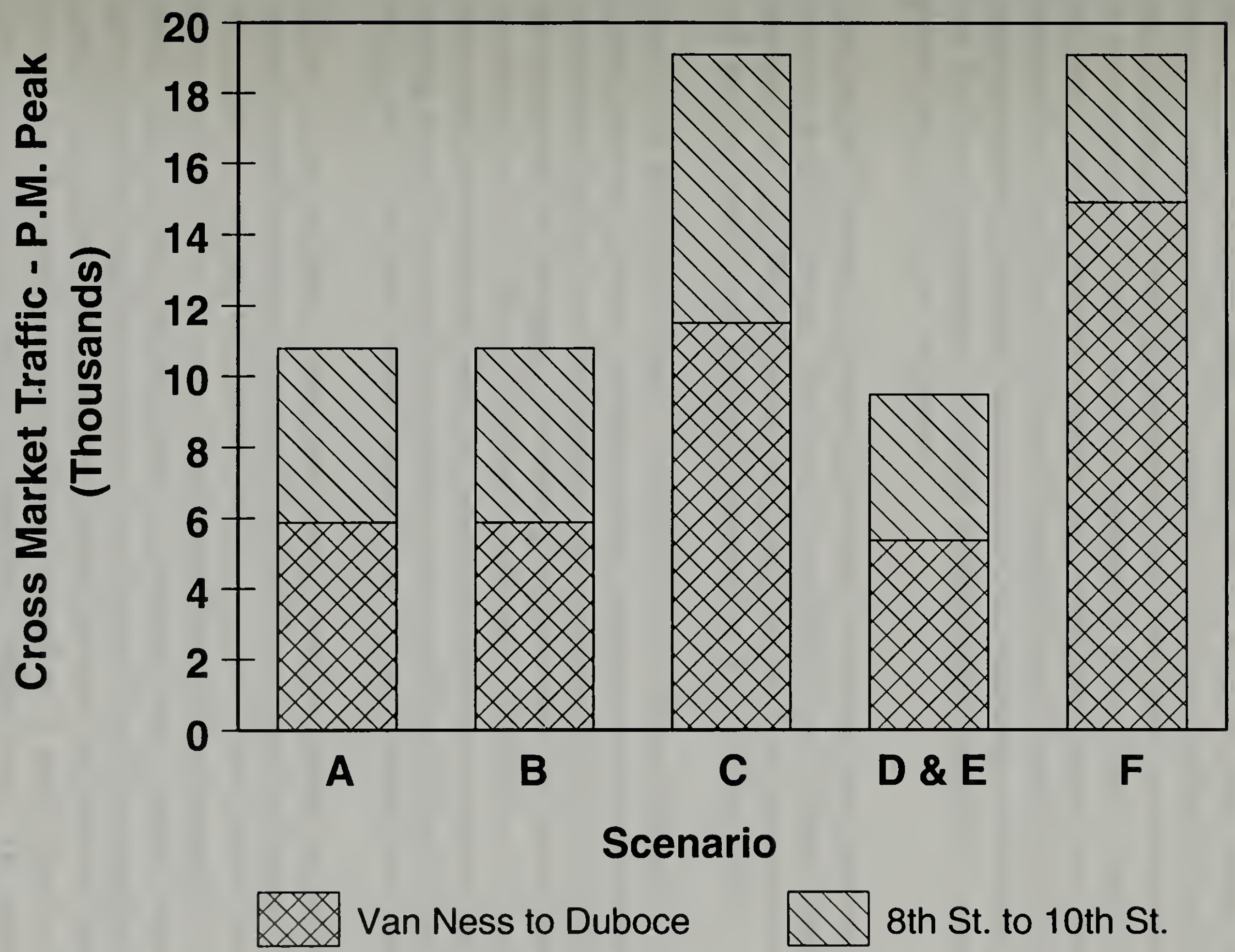

Notes: Alternative A is the basic Retrofit Option.
Alternative B is the Retrofit Option with Oak Street Two-Way.
Alternative C is the Mission Street Terminus.
Alternative D & E is a Single Deck to Oak Street.
Alternative F is the Local Access Plan for a South of Market Terminus.

Figure 4-5

PM PEAK HOUR CROSS MARKET STREET TRAFFIC VOLUMES

- Distances available for weaving, acceleration, deceleration and merging traffic movements; and

- Amount of stacking space available to store vehicles and thereby limit spillover impacts.

The retrofit alternative would maintain present horizontal and vertical curves on the Central Freeway, which were designed to accommodate high speed mainline freeway speeds. The existing maximum grades of about six percent would also be retained. Decision distance is the distance clear of exit and on-ramp traffic conflicts, approaching an exit ramp. Northbound motorists have a minimum 1,600 feet of decision distance approaching the Mission Street off-ramp and southbound motorists have a minimum 2,300 feet of decision distance approaching the Bay Bridge exit. Weaving distances between I-80 and the Mission/South Van Ness ramps would remain 2,300 feet southbound and 1,600 feet northbound. The total existing stacking capacity is estimated to be 970 cars southbound and 920 cars northbound.

The Modified Retrofit (Alternative B) provides virtually the same geometry and safety features as the basic Retrofit concept. The new on-ramp link between Octavia Street and Laguna Street, however, has a tight 80 foot radius turn leading onto the Oak Street on-ramp. While this radius is sufficient for trucks, buses and other large vehicles, it is a low speed turn.

Removal of the Oak/Fell ramps, would eliminate the steepest grades and sharpest curves on the Central Freeway. Decision distances would remain the same for southbound traffic. However, northbound decisions would be eliminated by routing all traffic off at a single exit ramp. Weaving distances would be unchanged, but stacking distances would be reduced from 970 cars to 620 cars southbound and from 920 cars to 660 cars northbound. These shorter stacking distances (33 percent loss) would increase the frequency of queuing on surface streets and on the Central Freeway. The stacking distance loss would be exacerbated in the northbound direction, since freeway exit capacity would also be lost (from two exit ramps to just the single Mission Street ramp).

The two single deck Market Street alternatives would have similar design features except for their vertical profiles. Existing weaving and decision distances would not change. Stacking capacity would also remain unchanged, because the increased number of lanes would offset the capacity lost by shortening the Central Freeway. The Haight Street Bridge alternative would involve a vertical profile rising at a three percent grade from Mission Street to Market Street, descending at a ten percent grade to Haight Street where it would begin a level grade approach to Oak Street. This profile is not consistent with maximum standard grades of six percent on freeway mainlines, and it includes two directional changes - a thirteen percent grade change crest curve near Market Street and a ten percent grade change sag curve near Haight Street. The resultant profile would be somewhat like a roller coaster. The Haight Street closure alternative would have a profile which rises at a three percent grade from Mission Street to McCoppin Street where a single six percent grade change vertical curve would land the freeway at Page Street at a three percent down grade.

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The Twelfth Street Exit alternative would shorten the minimum decision distance for northbound traffic from Highway 101 and would reduce stacking capacity. The Twelfth Street exit follows 1,200 feet from the Bay Bridge decision point. Southbound and northbound stacking capacities would be reduced from 970 cars to 680 cars and 920 cars to 760 cars respectively. This stacking capacity loss is about 25 percent of the present capacity.

CONSTRUCTION IMPACTS

All of the alternatives will involve some construction period impacts on traffic, transit and local residents and businesses. The Retrofit Alternative (A) would limit these impacts to the shortest period of time (one to two years) and have the least impact on traffic and transit. Construction impacts on local residents and businesses would also tend to be the least for the basic retrofit alternative.

Aside from disruptions along Oak Street between Gough and Octavia Streets, Alternative B (Modified Retrofit) would have similar construction period impacts Alternative A. Significant closures, if any, are not anticipated at the Oak/Fell ramps.

Construction period impacts associated with the Mission Street Terminus alternative (Alternative C) would be severe, but probably not too dissimilar to ultimate project impacts. During demolition, traffic would also be disrupted at the Mission Street/Thirteenth Street intersection for some periods which would further reduce freeway exit capacity. Demolition would result in noise and dirt impacts as well as in traffic impacts.

The single deck Market Street crossing alternatives (D and E) would have substantial construction period impacts. Traffic would be severely congested during demolition and construction. Some mitigation could be provided by an interim freeway ramp stubbing down to grade at Valencia or Market Streets. Traffic conditions during construction would be as described for the Mission Street Terminus Alternative. Some additional impacts on Haight and Page Streets east-west traffic would also be experienced. Noise and air pollution impacts would also be significant.

The Twelfth Street Exit alternative (F) would facilitate some construction period rerouting of freeway exit traffic via the new Twelfth Street ramp if it could be built prior to demolition. Otherwise it would have similar impacts as described for Alternative C. Residents and businesses along Twelfth Street would be inconvenienced.

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ESTIMATED COMPLETION DATE

The longer the unstrengthened freeway remains in place, the greater the risk of failure resulting from another earthquake. Completion times also are important in terms of realization of neighborhood benefits of non-retrofit alternatives. The time frame required to complete the basic retrofit alternative is projected to be two to five years, as shown in Table 4-1. The longer end of the range would occur if an environmental impact statement were required. The Modified Retrofit alternative (B) is assumed to require an environmental impact statement and some additional design and construction work. Three to five years are estimated to complete this alternative.

Table 4-1
ESTIMATED COMPLETION YEARS

Alternative	Planning	Design	Construct	Total
A Retrofit	1-2	1	1-2	**2-5**
B Modified Retrofit	1-2	1	1-2	**3-5**
C Mission Terminus	2	1	1	**4**
D Haight St. Bridge	2-3	2-4	2-3	**6-10**
E Haight St. Closure	2-3	2-3	1-2	**5-8**
F 12th Street Exit	2-3	2-4	3-5[1]	**7-12[1]**

[1]Includes 2 to 3 years allowance for staging complementary intersection grade separations.

The Mission Street Terminus alternative (Alternative C) is estimated to require four years to complete. An environmental impact statement would be required, but only limited design efforts appear needed. The Single-Deck Haight Street Closure (E) concept is estimated to require five to eight years for completion. A significant amount of design time is envisioned for demolition, design of a new elevated structure and design of the North of Market Street cut and surface street. Six to ten years are envisioned to complete the slightly more extensive Haight Street Bridge alternative (D).

The Twelfth Street Exit alternative (F) is estimated to need seven to twelve years to complete. The longer length of time for this alternative is due to the need to stage freeway construction with South of Market local intersection improvements including grade separation of the South Van Ness Avenue/Mission Street intersection.

Recognizing the relative urgency of this project, some fast-tracking is certainly possible. The environmental process probably will be difficult to shorten. Design work, however, could begin prior to completion of planning studies, although this would increase design costs. Construction periods

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probably could be shortened, but the proximity of residences and businesses to the corridor will limit 'round-the-clock construction schedules.

ESTIMATED COSTS

Order-of-magnitude cost estimates were developed using as a base prior cost estimates presented in the August 28, 1991 Central Freeway Informational Report, prepared by Caltrans. These base costs were increased to reflect inflation. Costs do not include significant right-of-way acquisition costs, major underground utility relocation costs nor premium incentive fast-track construction contracts. As such, they are not engineering designed based estimates, but only order-of-magnitude costs.

Cost estimates for the six alternative freeway concepts are the lowest for the Mission Street Terminus alternative (C) ($10 million to $15 million) which involves demolition efforts only. The retrofit and modified retrofit alternatives (A and B) would be the next least expensive concepts, costing $45 million to $65 million. The cost for the Twelfth Street Exit alternative (F) is estimated to be about $60 million to $65 million, which comprise $30 million of the total $60 million to $65 million. Cost estimates for the six alternative concepts are estimated as follows:

	Cost in $ Millions
A. Retrofit	$45 to $50
B. Modified Retrofit	$50 to $65
C. Mission Street Terminus	$10 to $15
D. Single Deck-Haight Street Bridge	$70 to $90
E. Single Deck-Haight Street Closure	$55 to $70
F. Twelfth Street Exit	$60 to $65

Except for the Mission Street Terminus concept, costs are the same order of magnitude for all six alternatives. Concepts which involve tunneling under Market Street (if that were feasible) would significantly increase cost to another order of magnitude.

SUMMARY

The alternatives assessed indicate that the single deck Market Street crossing concepts provide similar level of service conditions as the retrofit project and therefore represent viable alternatives to the retrofit project. South of Market alternatives would provide the greatest livability benefits to the Central Freeway corridor north of Market Street, however, impacts would be shifted to other areas. Table 4-2 summarizes key aspects of the six alternatives evaluated.

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Table 4-2
COMPARISON OF ALTERNATIVES EVALUATION MATRIX
San Francisco Central Freeway Areawide Traffic Study

Criteria	A Retrofit	B Modified Retrofit	C Mission Terminus	D Single Deck Haight St. Bridge	E Single Deck Haight St. Closure	F 12th Street Exit
Visual Impacts	status quo	very minor	3,000 feet of structure removed	• Octavia Blvd. • Lower single deck crossing Market Street	• Octavia Blvd. • Lower Structure • Single deck crossing Market Street	• 3,000 ft structure/barrier removed-Octavia • new 12th Street ramp • intersection grade separations
New Right-of-Way	none	none	none	Possible	possible	1.2 acres [1]
Developable Land	none	none	8.8 acres	3.1 acres	2.6 acres	8.8 acres
Neighborhood Impacts:						
North of Market	status quo	one block Oak St.	barrier removal	Octavia traffic	Octavia traffic	barrier removal
South of Market	status quo	status quo	traffic increase	status quo	status quo	12th Street traffic
Market Street	status quo	status quo	congestion	lower-wider barrier	lower-wider barrier	congestion
MUNI Impact	none	minor (16X)	numerous	Haight buses	Haight buses	numerous
Traffic Congestion (Level of Service)	7E and 1F	6E and 1F	6E and 10F	6E and 2F	6E and 2F	6E and 8F
At-Grade Traffic Cross Market (Pk Hr)	10,800 cars	10,800 cars	19,100 cars	9,500 cars	9,500 cars	19,100 cars
Stacking Capacity[2]	950 cars	960 cars	640 cars	960 cars	960 cars	720 cars
Construction Impacts	moderate	minor	minor	4 years	3 years	5 years
Staging	simple	simple	none	interim terminus	interim terminus	2-3 years for intersections
Estimated Completion Date	2-5 years	3-5 years	4 years	6-10 years	5-8 years	7-12 years
Construction Cost (millions): Freeway	$45-50	$50-65	$10-15	$70-90	$55-70	$30-35
Complementary Projects	–	–	$1	$1	$1	$30
Total Cost	$45-50	$50-65	$10-15	$70-90	$55-70	$60-65

[1] Brady Street and south end of 12th Street.
[2] Average of northbound and southbound.

5. OTHER TRANSPORTATION IMPROVEMENTS

A number of complementary traffic and public transit improvements offer promise to improve traffic and transit flow in the Central Freeway corridor. Except for Lombard Street and Van Ness Avenue measures which are described in Chapter 6, these complementary improvements are presented in this chapter. These improvements involve four categories of projects:

- Freeway Access Construction Projects;
- Freeway Access Operational Measures;
- Minor Improvement Measures; and
- Public Transit Measures.

FREEWAY ACCESS CONSTRUCTION PROJECTS

Four possible projects which could be built in conjunction with any Central Freeway alternative were identified to improve access to San Francisco's freeway system:

- Construct an underpass at the Mission Street/South Van Ness Avenue intersection;
- Add a third lane to the Central Freeway off-ramp at Mission Street;
- Depress eastbound and westbound Thirteenth Street at South Van Ness Avenue; and
- Extend the westbound I-80 Eighth Street off-ramp over Eighth Street onto Harrison Street.

Mission Street-South Van Ness Avenue Underpass

The intersection of Mission Street and South Van Ness Avenue is a complicated, frequently congested and high accident intersection. It affects MUNI Routes 42, 47, 49, 14, 14L and 26 as well as Highway 101 traffic. At this key intersection, northbound Highway 101 traffic turns left from eastbound Mission Street onto northbound South Van Ness Avenue, crossing southbound Highway 101 traffic which continues straight on southbound South Van Ness Avenue. Congestion impacting either of these heavy Highway 101 traffic flows impacts the opposing flow at this key intersection. For example, southbound queue traffic to the South Van Ness Avenue on-ramp blocks the northbound left-turn movement onto South Van Ness Avenue. Conversely, the northbound queue on South Van Ness Avenue at Market Street sometimes blocks the southbound through movement.

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Two underpass concepts to decrease congestion and minimize the potential of intersection blockings were assessed. The first concept would depress a single westbound Mission Street lane beginning at Eleventh Street under South Van Ness Avenue and resurface this lane 200 feet east of Gough Street. A surface lane would be provided for right-turns from westbound Mission Street onto South Van Ness Avenue and for signal preempted MUNI vehicles. About 700 to 800 VPH are forecast to use the southbound underpass. The AM peak LOS at this intersection would improve from C to B with this improvement. In the PM peak, the LOS would improve from D to C. This concept would prohibit pedestrian crossings of South Van Ness Avenue on the north side of the intersection and direct pedestrian traffic to cross on the south side of Mission Street.

Depression of two lanes of southbound South Van Ness Avenue traffic beginning about 300 feet north of Mission Street and resurfacing about 400 feet south of Mission Street (Figure 5-1) also would improve the Mission Street intersection AM peak LOS to B and the PM peak LOS to C. It appears that the southbound underpass would be slightly more effective at reducing congestion because it provides the added benefit of grade separating northbound and southbound Highway 101 traffic conflicts. Since the southbound traffic movement is not a MUNI movement, it also would avoid complications of trolley rewiring and signal preemptions. No conflicts would occur with the underground BART tunnel which is located just south of the Market Street/South Van Ness Avenue intersection. Bringing this tunnel to the surface south of Mission Street would be simpler if northbound South Van Ness Avenue traffic were routed onto Twelfth Street. No pedestrian crossing restrictions would be needed for this concept which would cost about $15 million.

Add Third Lane to Mission Street Exit

The Highway 101 off-ramp/Mission/Otis/Duboce intersection is also a complicated, heavy traffic and high accident location. It serves four major traffic flows:

- Thirteenth Street to Duboce Street (surface street under the freeway);
- Highway 101 off-ramp;
- Mission Street through traffic; and
- Otis Street left turn onto Thirteenth Street traffic.

Depression of any of these movements except perhaps for the northbound Mission Street movement is complicated by the location of the BART tunnel which is aligned under Otis Street north of Thirteenth Street and under Mission Street south of Thirteenth Street. While depression of the northbound Mission Street movement would yield some capacity improvements, the most cost-effective measure would be to add a third off-ramp lane with a dedicated right-turn approach lane. The present right-turn lane is about 100 feet long and is blocked by traffic waiting to go straight onto westbound Duboce Street during most signal cycles. The exit ramp upgrade would provide two

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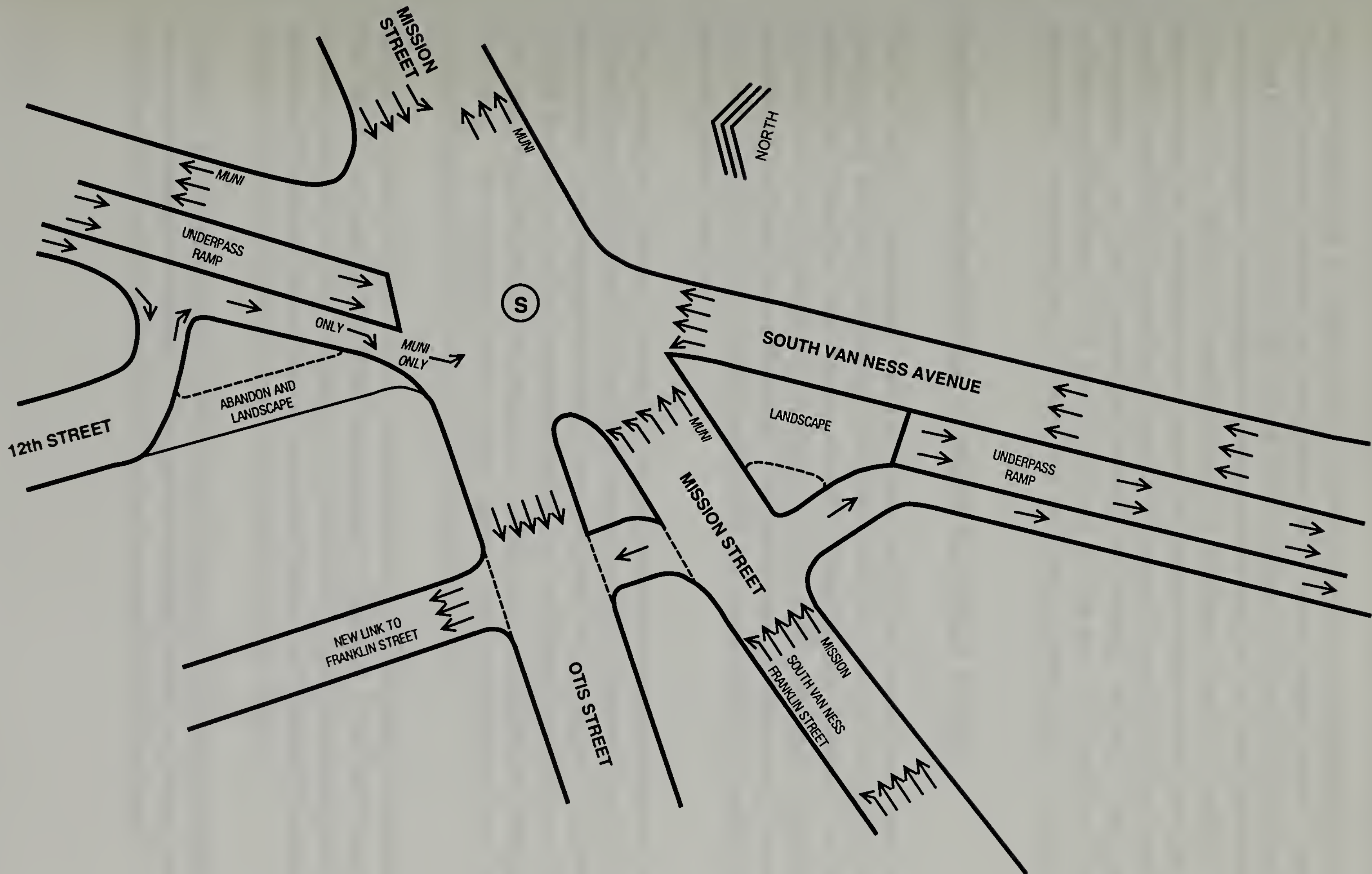

Figure 5-1
MISSION STREET/SOUTH VAN NESS AVENUE GRADE SEPERATION
DF-FINAL\SVNGRADE-7/28/94P

initial exit lanes (one for Duboce Street and one for northbound Highway 101) with the second Duboce Street exit approach lane being about 500 feet east of Mission Street. The ramp widening would require use of some of the existing sidewalk right-of-way north of the off-ramp. If a six foot wide sidewalk cannot be maintained on the north side along the exit ramp, this sidewalk should be relocated to the Thirteenth Street right-of-way by eliminating some curb parking. An additional right turn from the off-ramp entry onto westbound Mission Street would be provided. The off-ramp would be controlled by a pedestrian actuated traffic signal to ensure pedestrian safety. This project is estimated to cost one to two million dollars. The widened exit ramp is projected to improve morning peak intersection LOS from E to C, and the PM peak LOS from F to D for this critical movement at this intersection. Construction would disrupt traffic using the off-ramp.

Depress Thirteenth Street at South Van Ness Avenue

Both the capacity limitations of the single lane South Van Ness Avenue loop ramp and traffic disruptions at the nearby Thirteenth Street/South Van Ness Avenue intersection restrict freeway access at the South Van Ness Avenue on-ramp. Widening this on-ramp to two lanes will help improve access, but full benefits of this measure will not be achieved without capacity improvements at the South Van Ness Avenue/Thirteenth Street intersection. Conversion of Howard Street-South Van Ness Avenue to a one-way southbound street (see next section) is a possible approach as are grade separation measures.

The proximity to Thirteenth Street of the Howard Street intersection and the entry for the freeway on-ramp, preclude depression of South Van Ness Avenue under Thirteenth Street. Thus, Thirteenth Street would need to be depressed under South Van Ness Avenue (Figure 5-2). Folsom Street and Mission Street, which are the nearest intersections on Thirteenth Street, are located 500 feet away. This distance is sufficient for low speed ramps (250 feet) and weaving/intersection approach queues (250 feet). The depressed roadway might require costly modifications to the center median foundation supports for the elevated Central Freeway structure.

The concept shown in Figure 5-2 also separates Howard Street southbound traffic from South Van Ness Avenue on-ramp traffic. With the separation of principal traffic conflicts the traffic signal could be removed from this intersection or converted to a pedestrian-crossing-only signal. With present traffic volumes the two lane on-ramp would operate at 60 percent of its capacity (LOS B) during the AM and the PM peak hours, compared to its current LOS E/F.

Congestion at the on-ramp presently limits traffic volumes at the Thirteenth Street/South Van Ness Avenue intersection and existing LOS conditions therefore describe better than actual conditions. Significant traffic impacts would occur during the construction of the underpass.

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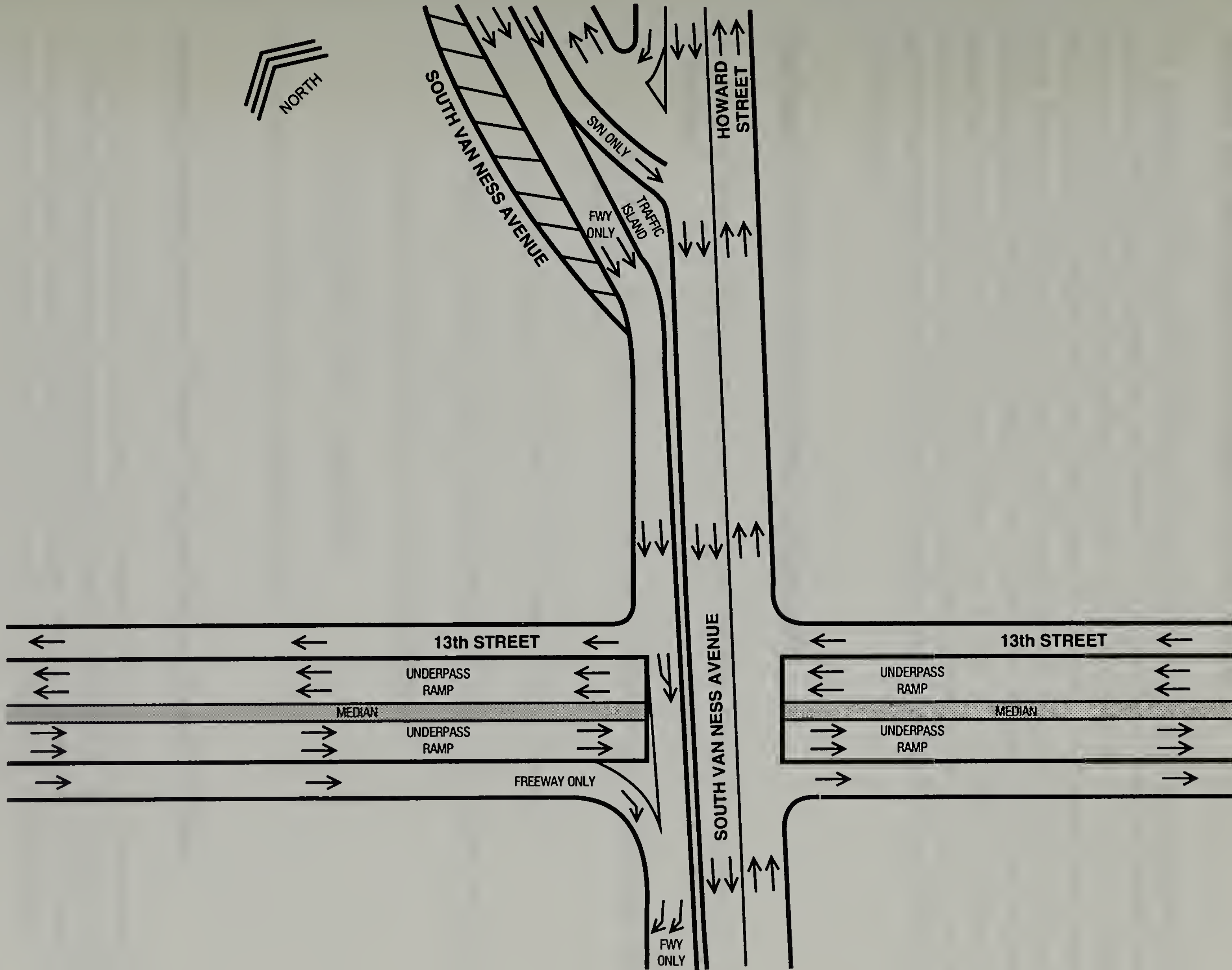

Figure 5-2
SOUTH VAN NESS AVENUE/MISSION STREET UNDERPASS CONCEPT
DF-FINAL\UNDERCON-7/29/94P

Extend the Westbound I-80 Eighth Street Ramp

The Eighth Street/Harrison Street/I-80 off-ramp intersection serves three major approaches which compete for traffic signal "green time" and capacity. The Eighth Street ramp is relatively short and traffic can quickly stack back onto the mainline freeway. This concept would extend the westbound freeway off-ramp over Eighth Street and land it along the north side of Harrison Street adjacent to a bus storage yard (Figure 5-3). This landing would facilitate the high volume right turn from westbound Harrison Street onto northbound Ninth Street. The 800 foot-long single lane structure would land about 200 feet east of Ninth Street. The LOS at the Eighth and Harrison Streets intersection is projected to improve from B to A during the AM peak and from LOS D to C during the PM peak with this measure. Traffic would be impacted during construction, particularly the off-ramp movement.

FREEWAY ACCESS OPERATIONAL MEASURES

A number of low-cost traffic operational measures were identified and evaluated to improve access to freeways:

- Extend the Folsom/Howard Street one-way couplet south of Thirteenth Street to Fourteenth Street;
- Add a second lane to the South Van Ness Avenue loop on-ramp;
- Establish a new link between Mission Street and Franklin Street near Brady Street;
- Channelize the Howard/South Van Ness intersection; and
- Close McCoppin Street at Gough Street.

Each of these operational measures is discussed below.

Extend Folsom/Howard Street Couplet to Fourteenth Street

One-way traffic streets minimize traffic disruptions caused by left-turns. The present one-way system on Howard and Folsom Streets terminates at Eleventh Street. Extending the couplet to Fourteenth Street would reduce capacity problems on Thirteenth Street at South Van Ness Avenue and at Folsom Street. This measure alone is forecast to result in the following improvements:

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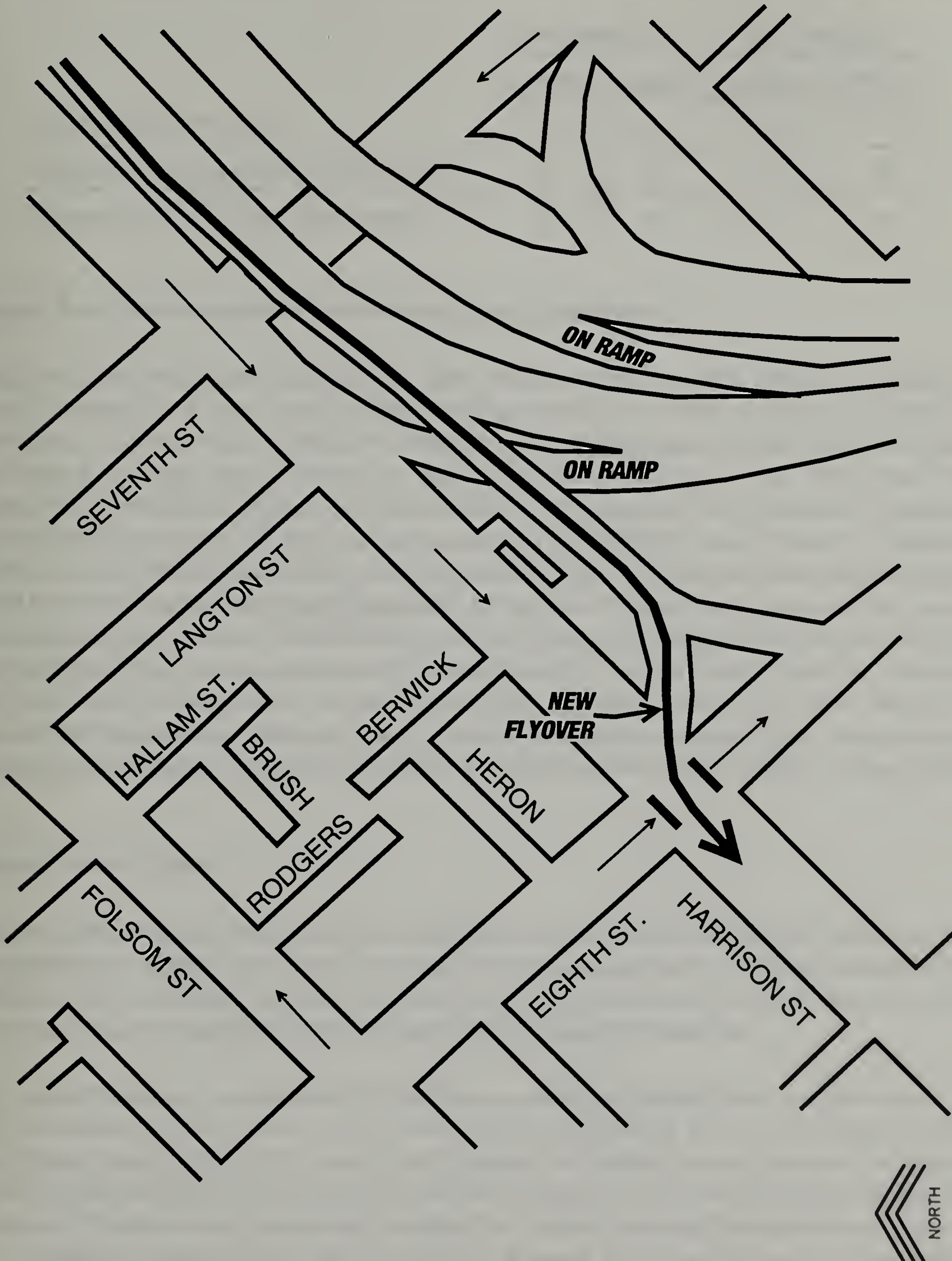

WILBUR SMITH ASSOCIATES

Figure 5-3
I-80 RAMP CAPACITY UPGRADES

DF-FINAL\I80RAMP-7/26/94PF

	AM Peak LOS		PM Peak LOS	
	Existing	Project	Existing	Project
Thirteenth and Folsom	A	A	D	C
Thirteenth and South Van Ness Avenue	C	A	D	B
Howard and South Van Ness Avenue	D	A	E	A

South Van Ness Avenue On-Ramp Lane Addition

Single lane loop ramps typically can serve 1,500 VPH compared to 2,500 VPH for two-lane loop ramps. Currently peak hour traffic volumes using the on-ramp are at the maximum of 1,500 VPH. A two-lane on-ramp would require some expensive entry improvements to the mainline freeway. The second on-ramp lane, however, is needed to reduce delays at the South Van Ness Avenue/Thirteenth Street/Howard Street intersection. It would also help minimize construction period traffic disruptions for the Central Freeway. Even if the Central Freeway is ultimately retained north of Market Street, the truck route and Highway 101 route designation almost certainly would be maintained for the Mission Street/South Van Ness Avenue ramps. As such, the two-lane loop ramp project would be consistent with Central Freeway concepts which terminate north of Market Street as well as alternatives which terminate south of Market Street. Addition of a second lane to the loop on-ramp, would require restriping the Central Freeway from three lanes to two between Oak and Mission Streets in order to provide an exclusive on-ramp lane. There would be no loss of freeway capacity since the Oak Street on-ramp provides only two lanes of access capacity.

Brady Street Link

Removal of the Gough/Franklin ramps has complicated access between the Central Freeway and the Gough/Franklin corridor. As a result, Oak and Fell Streets carry higher traffic volumes than they did before the earthquake, left-turns have increased along northbound Van Ness Avenue and the South Van Ness Avenue/Mission Street intersection is regularly congested.

One concept to improve northbound Central Freeway access to Franklin Street would be to acquire right-of-way and construct a new roadway between Otis and Market Streets, replacing the ad hoc Brady Street route (Figure 5-4). Some traffic exiting the Central Freeway destined for Franklin Street currently makes a "U" turn at South Van Ness Avenue from eastbound Mission Street onto westbound Otis Street and then reaches Franklin Street via northbound Brady Street and a left-turn from eastbound Market Street. The new direct link would be located midway between Twelfth Street and Brady Street, intersecting Market Street directly opposite Franklin Street. While this new

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Figure 5-4
BRADY STREET LINK

link is projected to improve a number of other problems, the addition of a new intersection approach and more traffic to the Market Street-Franklin Street intersection would worsen conditions at this intersection. If the Central Freeway is retained north of Market Street and the South Van Ness Avenue underpass of Mission Street is pursued, the Brady Street link loses its attractiveness.

Howard, South Van Ness Avenue Channelization

The Howard/South Van Ness intersection is a major bottleneck limiting access to the Central Freeway. Inefficient operation at this STOP sign controlled intersection results in less than fully "loaded" approaches on the southbound South Van Ness Avenue approach to Thirteenth Street. As reported in Chapter 2, this intersection experienced the second highest number of accidents in the city during 1993. While a number of projects offer promise to improve operations at this intersection, their benefits would be limited without complementary improvements to the adjacent Thirteenth Street intersection and to the single lane freeway on-ramp.

Four improvement concepts (Figure 5-5) were identified for the Howard Street intersection:

1. Designate Howard Street as one-way eastbound between South Van Ness Avenue and Twelfth Street, essentially eliminating one approach to the intersection;

2. Realign Howard Street to intersect South Van Ness Avenue at a perpendicular "T" intersection about 200 feet north (opposite Plum Street) of its present intersection and signalize the new intersection;

3. Provide a physically separate channel for South Van Ness Avenue traffic to access the freeway on-ramp which would prevent westbound traffic on Howard Street from accessing the loop on-ramp and direct Howard Street traffic to Eighth and Tenth Street freeway ramps; and

4. Extend the Howard and Folsom Streets one-way couplet to Fourteenth Street and eliminate Howard Street access to the freeway on-ramp.

These concepts are evaluated below.

Eliminate Howard Street Approach - Designation of Howard Street as one-way eastbound between South Van Ness Avenue and Twelfth Street would divert most freeway bound motorists to the Eighth and Tenth Street on-ramps, but would also create a circuitous path for traffic which uses Howard Street between Downtown and the Mission District (Figure 5-5). Designation of this one block of Howard Street as an eastbound one-way street and the long segment between Eleventh and

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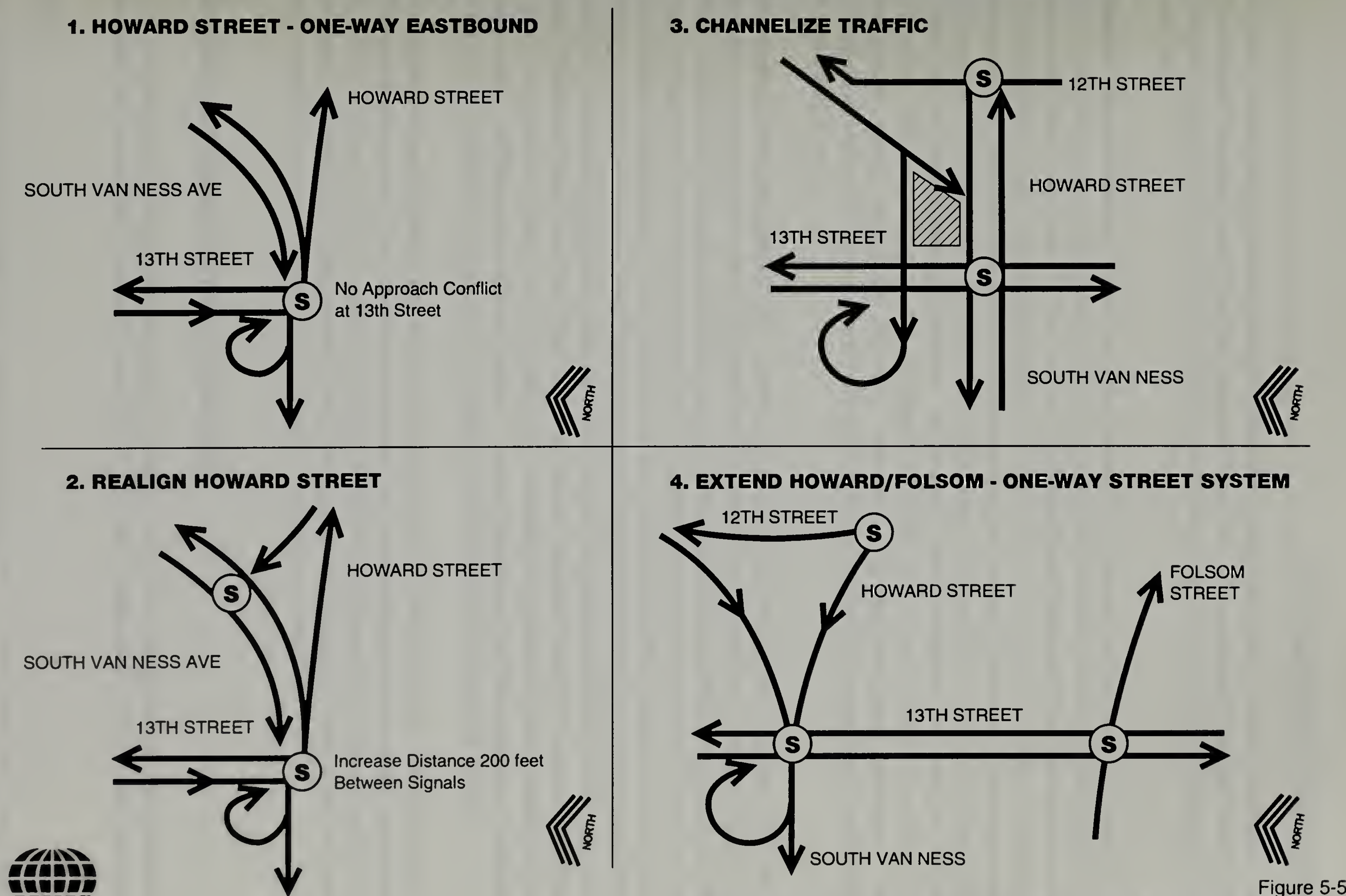

Figure 5-5

HOWARD/SOUTH VAN NESS AVENUE INTERSECTION CONCEPTS

WILBUR SMITH ASSOCIATES

DF-FINAL\CONCEPTS-8/12/94C

Fremont as a one-way westbound street would tend to confuse motorists. The Howard/South Van Ness Avenue intersection would be less congested, since only one southbound approach would exist and full utilization of South Van Ness Avenue green time at the Thirteenth Street signal could be achieved.

Realign Howard Street - Relocation of the Howard Street intersection 200 feet farther away from the Thirteenth Street intersection would facilitate signalization of the new intersection (Figure 5-5). At present, there is only about 100 feet between the Howard and Thirteenth Street intersections, and the realignment would increase this distance to about 300 feet. While the two traffic signals could be timed to provide southbound South Van Ness Avenue progression, efficient and safe management of access and weaving within the 300 foot storage area would continue to be a major problem. Under normal traffic stacking conditions this concept appears attractive, but the peak period saturation demand stacking conditions present on South Van Ness Avenue suggest that this realignment concept would not effectively solve the congestion and safety problems. The realignment of Howard Street combined with grade separation of the Thirteenth Street intersection would function better.

Separate Traffic Channel - Traffic southbound on South Van Ness Avenue bound for the Central Freeway on-ramp could be physically separated from westbound Howard Street traffic (Figure 5-5). This concept could be implemented in two ways. The first approach would be to restripe South Van Ness Avenue near Thirteenth Street for two northbound lanes, three southbound lanes and two southbound on-ramp lanes. The two southbound on-ramp lanes would be separated from the three through southbound lanes by a four foot traffic island. Howard Street traffic bound for the freeway would be rerouted to Eighth and Tenth Street on-ramps. The westbound Howard Street right-turn onto Thirteenth Street would be prohibited. The second approach would be to acquire a strip of right-of-way from the Smart and Final store and construct the separate on-ramp channel in this right-of-way. Sufficient right-of-way appears to exist to implement the first approach. Desirably, left-turns northbound on South Van Ness Avenue should be diverted to Twelfth Street.

Howard-Folsom One-Way Couplet - This concept (Figure 5-5) would increase the capacity of the Thirteenth Street-South Van Ness Avenue intersection. It would also provide a wider right-of-way on South Van Ness Avenue to install the physical traffic island separator for on-ramp traffic. This concept also proposes diverting Howard Street freeway traffic to Eighth and Tenth Street on-ramps and prohibiting access at South Van Ness Avenue from Howard Street.

Convert McCoppin Street to One-Way

The intersection of Gough and McCoppin Streets is an unusual configuration which increases accident risks and limits the attractiveness of the Gough Street connection to Thirteenth Street and

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the South Van Ness Avenue Central Freeway on-ramp. This concept would designate McCoppin Street as a one-way eastbound street between Valencia and Otis Streets. This change would simplify the operations at the Otis/Gough/McCoppin intersection. Alternatively, McCoppin Street could be maintained as a two-way street but with no access permitted to it from the Otis/Gough/McCoppin intersection. Signalizing this intersection would also increase the attractiveness of the Gough Street connection to Thirteenth Street.

MINOR IMPROVEMENT MEASURES

Fourteen minor traffic measures offer promise to improve traffic flow:

- Additional peak period tow-away on parts of Oak, Fell and Franklin Streets.

- Ninth Street: Add parking meters in yellow zones to discourage overtime parking and allow trucks to get to curbs instead of double parking. Reorganize yellow zones in light of current truck loading demand. (Double parking and traffic and parking enforcement were a frequent comment on the post-card survey.)

- Reroute or eliminate the 49-Mile Scenic Drive to eliminate left-turns from northbound Van Ness Avenue to westbound Geary Street.

- Improve Webster Street as a north-south street.

- Explore with community the desirability of redesignating Hickory Street to one-way westbound between Laguna and Buchanan Streets. Oak Street on-ramp traffic sometimes uses eastbound Hickory Street to save time, adversely impacting local residents. Installation of a STOP sign might also discourage abuse if Hickory Street is retained as a westbound alley.

- Restripe the southbound approach of South Van Ness Avenue to Mission Street in order to provide a left-turn pocket serving MUNI buses and consider adding a right-turn lane as well;

- Install I-280 guide signs directing traffic on southbound South Van Ness Avenue along southbound Twelfth Street to eastbound Folsom Street to southbound Sixth Street to I-280 southbound. Install "KEEP CLEAR" pavement markings and "DO NOT BLOCK INTERSECTION" signs on northbound South Van Ness Avenue at Twelfth Street and provide a southbound left-turn pocket. The latter would eliminate a few parking spaces.

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- Implement a system of alternate freeway route signs in order to divert some freeway access traffic and thereby minimize queues.

- Add an eastbound right-turn lane on Thirteenth Street between Mission Street and South Van Ness Avenue by removing curb parking and restriping/resigning this intersection approach.

- Improve signage and channelization at the Oak/Laguna Street intersection to clarify right-of-way conflicts and reduce driver confusion.

- Investigate signalization of Hayes Street intersections at Octavia, Laguna and Buchanan Streets to reduce MUNI delays. Traffic and pedestrian implications need to be reviewed with the community.

- Explore urban design and landscaping measures to improve appearance of area beneath the freeway to provide immediate relief.

- Coordinate with on-going Caltrans efforts for advance traffic information system advising freeway motorists of congested conditions ahead.

- Add left-turn lanes on Thirteenth Street's eastbound approach to Folsom Street and westbound approach to South Van Ness Avenue. Left-turns should be prohibited on Thirteenth Street to Harrison and Bryant Streets. Traffic signals at Folsom and South Van Ness Avenue intersections on Thirteenth Street would be modified to provide exclusive left-turn phases for these new left-turn lanes at times left-turns cannot be accommodated during permissive green signal phase. Some curb parking along Thirteenth Street would be lost.

PUBLIC TRANSIT MEASURES

While not a principal focus of the Central Freeway Areawide Traffic Study, public transit opportunities and needs are important in reducing traffic congestion and providing improved mobility. A large number of respondents to the origin-destination postcard survey suggested consideration of transit improvements as did several attendees at the project's community workshops. The San Francisco County Transportation Authority is studying long range transit improvements in the Van Ness Avenue corridor.

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Four categories of public transit improvements were considered by the Central Freeway project.

1. Short range operational measures;
2. Interim construction period measures;
3. Long range improvements; and
4. Regional "seamless" transfer interfaces.

Short Range Operational Measures

At present it takes MUNI an average of 21 minutes to traverse the entire length of Van Ness Avenue (seven MPH) compared to about eight to ten minutes for automobile traffic. Another problem is that buses regularly run in bunches. Three MUNI lines operate the length of Van Ness Avenue, the 42, 47 and 49 lines. Routes 42 and 49 are long routes but Route 47 operates only on Van Ness Avenue from Aquatic Park to Mission Street. With current technology, MUNI could avoid bunching by determining the location of the long route buses (Routes 42 and 49) and dynamically dispatching the short route bus (Route 47) to fill service gaps.

Interim Construction Period Measures

Specific construction period measures depend on the Central Freeway concept adopted. Additional transit preferential projects and minor MUNI rerouting may be needed during construction periods, when traffic congestion is likely to become more frequent. MUNI Mission Street lines 14 and 49 and Route 19 are most likely to suffer delays. Intersection blockage enforcement will be critical to MUNI service on east-west streets. Possible transit improvement strategies include:

- Reroute MUNI Route 49 around congestion at Mission/South Van Ness Avenue possibly via Sixteenth Street, Howard/Folsom, Ninth/Tenth Streets to Van Ness Avenue;

- Designate bus/HOV lanes on Seventh, Eighth, Ninth and Tenth Streets;

- Strengthen the intersection blockage enforcement program; and

- Consider interim curb parking removals.

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Long Range Improvement Measures

MUNI, the City and Caltrans might want to consider establishing peak period peak direction bus/HOV lanes on Van Ness Avenue. During the morning peak traffic hour about 2,500 vehicles per hour (VPH) use Van Ness Avenue in the peak direction. Peak direction afternoon traffic is about 2,000 VPH. If the average vehicle occupancy is 1.2 persons per vehicle, these volumes translate into 1,000 person trips per lane during the morning peak hour and 800 person trips per lane during the afternoon peak hour. At 40 persons per bus, 25 morning and 20 afternoon buses provide the equivalent capacity. Currently, MUNI and Golden Gate Transit combine to provide 33 morning and 25 afternoon peak hour buses on Van Ness Avenue north of McAllister Street/Golden Gate Avenue. This current volume of service, therefore, appears to justify consideration of bus only lanes.

Additional person-trip capacity could be achieved by allowing three-person-plus carpools to use the bus lanes. Use of the right-most traffic lane for the bus lane is suggested rather than a median lane since a median lane would require additional width that would eliminate curb parking that helps protect Van Ness Avenue pedestrians. Provision of bus stop sidewalk bulbs would minimize the curb parking lost and reduce pedestrian crossing times on Van Ness Avenue. Designation of the right-most traffic lane for bus/HOV would, however, increase general traffic congestion on the remaining two lanes. Further study and public review of bus/HOV lanes is suggested. MUNI is reportedly interested in a Van Ness Avenue center median bus lane and is also studying light rail service for the Geary Corridor.

Regional Public Transportation

Golden Gate Transit and East Bay BART/AC Transit service both provide relatively direct access to the northern and western parts of San Francisco. SamTrans and Caltrain service from the Peninsula is not as direct. Regional bus service along Nineteenth Avenue to Stonestown Shopping Center, San Francisco State University, Golden Gate Park, UCSF, University of San Francisco, Pacific Medical Center and the Golden Gate Bridge toll plaza could greatly reduce auto demand in the north-south direction. SamTrans Route 3B which serves San Francisco International Airport, Tanforan Shopping Center and BART could be extended to the north. A limited-stop service with perhaps ten total stops may be appropriate.

With respect to the Van Ness Avenue corridor, the present transfer option from SamTrans service is not very inviting (Ninth and Mission). A more secure and attractive Civic Center transfer facility might attract increased riders.

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The northbound Golden Gate Transit stop on Lombard Street at Fillmore Street also needs improvement. This stop is used by many patrons to change between Civic Center and Financial Center outbound routes. Golden Gate Transit is planning a relocation of this transfer function to Doyle Drive. The present stop has no shelter, bench or lights and is very short of curb space. Consideration should be given to relocating MUNI's Route 28 stop from the current nearside location to a farside stop, improved lighting, a shelter and an automatic vehicle location electronic information system. The latter would lessen rider anxiety by providing two minute advance warning that their bus is approaching the stop. Currently, it is difficult to locate the proper bus, causing some passengers to miss their bus.

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6. SIGNAL TIMING AND OPERATIONAL ISSUES

Assembly Bill 434 (AB-434) provides grant funding from vehicle license fees for projects designed to improve air quality. Reducing vehicle stops and delay by improving traffic signal timings is considered to be a cost effective method of achieving significant air quality benefits. AB 434 funds have been allocated for retiming 30 traffic signals on Van Ness Avenue from Fell to Bay Streets, plus 14 additional signals on Lombard Street/U.S. 101 from Van Ness Avenue to the Golden Gate Bridge approach at Richardson Avenue and Francisco Street.

The first part of this chapter describes proposed operational changes along Lombard Street and Van Ness Avenue. The latter section of the Chapter describes the TRANSYT-7F signal timing optimization analyses. A separately bound Appendix Report presents details of the AB-434 signal improvement analyses.

VAN NESS AVENUE OPERATIONAL IMPROVEMENTS

Van Ness Avenue has 31 signalized intersections along its 10,700 foot section from Market Street to Bay Street. It is designated as US 101, is a major transit street and carries a large volume of trucks and buses. The transition from an automobile dealership/commercial retail street to high density residential, office use and retail land use has probably led to pedestrian traffic increases.

Physical Features

Van Ness Avenue has a 94 foot wide curb to curb width which accommodates curb parking lanes along both sides of the street, three traffic lanes in each direction and a 14 foot wide landscaped median which has several left-turn pockets. Blocks are spaced about 350 feet apart on Van Ness Avenue.

Traffic Characteristics

The average daily traffic on Van Ness Avenue <u>north</u> of McAllister Street is 60,000. On weekdays between 7:00 AM and 8:00 AM, the directional traffic split on this segment of Van Ness Avenue is approximately 23 percent northbound and 77 percent southbound, with southbound traffic approximately 2,200 VPH south of Lombard Street and 2,000 VPH south of Sacramento Street. The AM peak period ends at approximately 10:00 AM. On weekdays between 5:00 PM and 6:00 PM,

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the directional split on Van Ness Avenue north of McAllister Street is approximately 55 percent northbound and 45 percent southbound with northbound traffic approximately 1,900 VPH south of Lombard Street and also south of Sacramento Street. Thus, AM peak traffic is more directionally imbalanced than PM peak hour traffic.

Average daily traffic on Van Ness Avenue is 54,000 south of McAllister Street. On weekdays between 8:00 AM and 9:00 AM, the directional split on Van Ness Avenue is approximately 46 percent northbound and 54 percent southbound, with approximately 1,600 VPH southbound. Between 5:00 PM and 6:00 PM, the directional split is 53 percent northbound and 47 percent southbound, with approximately 1,800 VPH northbound. Traffic on this southern segment of Van Ness Avenue is more directionally balanced than on the segment north of McAllister Street.

Average travel speeds on Van Ness Avenue average about 15 MPH during morning peak periods. Speeds north of Clay Street are about 14 MPH midday and 17 MPH during the afternoon peak hours. South of Clay Street speeds tend to be a little slower, 12 MPH midday and afternoon peak hours.

Traffic on Van Ness Avenue typically moves slowly. Weekend traffic often is the most congested. Problems include: overflow of left-turn pockets at key intersection, frequent flow disruptions due to bus loading activities and delays caused by pedestrian crossings. As discussed in Chapter 2, overflow of left-turn pockets blocks through traffic lanes and increases accident risks. The high volume of bus traffic and passenger loadings combined with bus bunching tendencies result in congestion at bus stops and occasional blockages of through traffic movements. High pedestrian volumes impede right-turn movements and require minimum traffic signal green time allocations for side streets. This 20 second allocation is barely enough for more able pedestrians to cross Van Ness Avenue and is not long enough for some elderly and disabled to cross the entire street in a single traffic signal cycle.

Signalization

Traffic signals along Van Ness Avenue operate on three different timing plans: AM peak, PM peak and off peak (includes weekends). This is the maximum number of timing plans which current traffic signal hardware can provide. New equipment presently on order will be able to provide numerous signal timing plans responsive to changing traffic demands. Signals north of Clay Street operate on a 90 second cycle length and those south of Clay Street operate on a 60 second cycle. The shorter 60 second cycle is consistent with cycle lengths for most downtown signals in San Francisco and facilitate timing progression for east-west cross streets of Van Ness Avenue. North of Clay Street, east-west streets tend to carry lower traffic volumes and cross street progression is not as important. In general, shorter signal cycles are beneficial to pedestrians and buses, whereas

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longer cycle lengths tend to benefit general traffic provided that blocks are sufficiently long to accommodate stacking traffic. Traffic signals are timed to optimize the movement of general vehicle traffic not for pedestrian and buses. When signals are missed, the short traffic signal cycles minimize wait time for pedestrians, buses, and general traffic . Van Ness Avenue has relatively short blocks and heavy traffic which limits the possible length of efficient signal cycles. For very wide streets like Van Ness Avenue, however, short signal cycles tend to impose minimum pedestrian crossing times. The 94 foot width of Van Ness Avenue requires significant side street signal green time (20 seconds) allocations to accommodate pedestrians.

Improvement Measures

In order to maintain east-west signal progression, the present 60 second cycle south of Clay Street and 90 second cycle north of Clay Street should be maintained. Allocating more green time to Van Ness Avenue by providing longer signal cycles would primarily benefit regional traffic at the expense of MUNI and traffic on side streets. MUNI operates three routes along Van Ness Avenue with an average of twenty buses scheduled per hour in each direction during commute periods. East-west side street crossings of Van Ness Avenue are served by about a dozen basic routes and a half dozen commute period only routes. About 150 buses are scheduled per hour in each direction crossing Van Ness Avenue during commute periods. As such, MUNI operates about seven times the amount of service on east-west cross streets as it does on Van Ness Avenue. Because Van Ness Avenue traffic is allocated more than two-thirds of the signal green time, average side street MUNI delays tend to be twice as long as Van Ness Avenue signal delays.

Given the maintenance of the current cycle lengths, seven improvement measures were evaluated for Van Ness Avenue:

1. Prohibit left-turns from Van Ness Avenue at all intersections except Broadway and Lombard Street;

2. Eliminate exclusive left-turn signal phases northbound on Van Ness Avenue at Pacific Avenue and at Union Street;

3. Permit new left-turn movements from Van Ness Avenue at Post and Sutter Streets;

4. Install presence detectors near the end of principal left-turn pockets to activate exclusive phases only when blockage of through traffic is threatened;

5. Widen and landscape the median on Van Ness Avenue between Lombard Street and Chestnut Street;

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6. Provide a "center" passenger loading platform for southbound MUNI buses at Bay Street; and

7. Close Van Ness Avenue medians at selected intersections.

Prohibit Left-Turns - Prohibiting left turns from Van Ness Avenue would allow the elimination of inefficient left-turn signal phases and would eliminate left-turn pocket overflow blockages of through traffic lanes. It would also allow redevelopment of turn pockets into a more attractive landscaped median. Some traffic would divert to Franklin and Gough Streets, while other left-turn traffic would make indirect left-turns by turning right from Van Ness Avenue followed by two more turns on Polk, Franklin or Gough Streets (see Figure 5-3). Traffic implications of the no left turn concept are based on a 25 percent diversion of left-turns onto parallel streets. The remaining 75 percent were reassigned to the indirect left-turn paths shown in Figure 5-3.

Analysis of the no left-turn prohibition using a sophisticated computer model (TRAF-NETSIM) found that besides eliminating queue spillovers from left-turn bays on Van Ness Avenue, the following can be said about the proposed no left-turn concept.

- System-wide vehicle-miles, vehicle-hours, and mean travel time would increase; this may be reflecting more circuitous routes required when left-turns are eliminated;

- Existing through and right-turn traffic would benefit from the reallocation of green time;

- Increased right-turn volumes would worsen queuing on northbound Van Ness Avenue at Grove Street, McAllister Street, and Post Street, and on southbound Van Ness Avenue at Turk Street;

- Westbound left-turns on Turk Street at Gough Street would experience worse delays at LOS E under the proposed scenario (this section of Turk Street would absorb a portion of existing Van Ness Avenue southbound left-turns at Golden Gate Avenue and McAllister Street.) Buses would still be permitted to make the southbound left-turn at Golden Gate Avenue;

- Increased right-turn volumes would increase the number of pedestrian/vehicle conflicts throughout the network and would increase vehicle delay.

- Northbound through movements at Van Ness Avenue/Hayes Street and northbound through and right-turn movements at Van Ness Avenue/Grove Street would experience increased delay, but would continue at LOS D or better.

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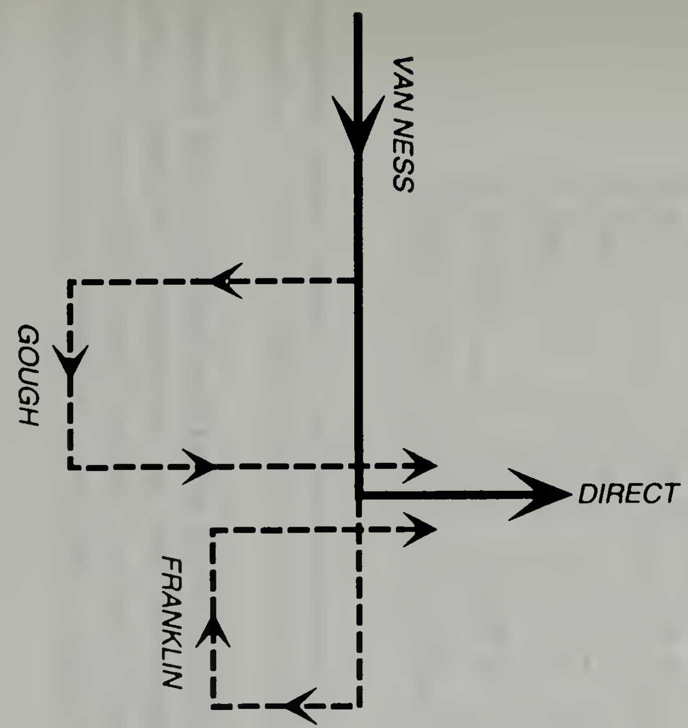
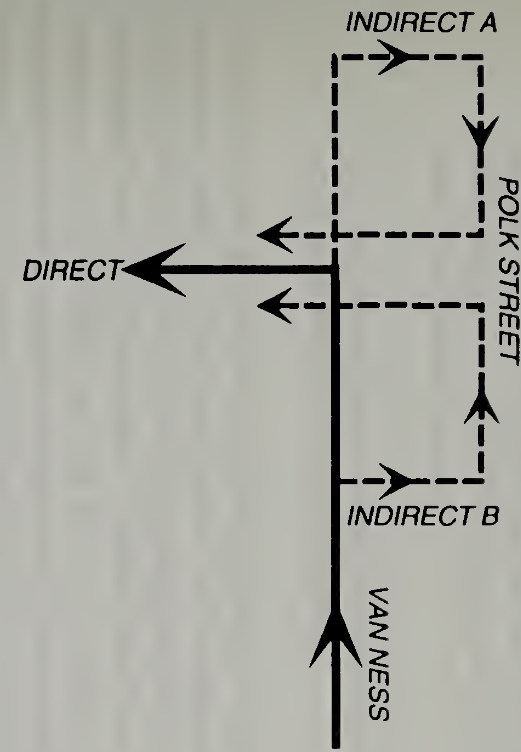


SOUTHBOUND LEFT TURN

	Signals	Blocks	Lefts	Rights
Direct Left	1	0	1	0
Franklin Indirect	5	+4	0	3
Gough Indirect	5	+4	2	1



NORTHBOUND LEFT TURN

	Signals	Blocks	Lefts	Rights
Direct Left	1	0	1	0
Indirect A	5	+4	0	3
Indirect B	3	+2	2	1

Figure 6-1
INDIRECT LEFT TURN

- Increased right-turn volumes would increase bus delays on: southbound Van Ness Avenue at Sutter Street (20 percent increase), Ellis Street (eight percent increase), and Turk Street (nine percent increase); and on northbound Van Ness Avenue at Grove Street (ten percent increase).

- Hydrocarbon, carbon monoxide, and nitrogen oxide emission rates in the study network would increase by two to three percent.

The net effect of this left-turn prohibition would be to increase capacity and improve travel times for through traffic on Van Ness Avenue and worsen traffic conditions along parallel streets, particularly Polk Street. The Appendix Report presents the details of the Van Ness Avenue left-turn prohibition TRAF-NETSIM analysis. Table 6-1 describes projected traffic impacts on several key intersections along Franklin and Polk Streets. Relatively minor impacts are foreseen at Franklin Street intersections, but significant impacts are forecast along Polk Street, particularly at Pine, Bush, Geary and Turk intersections. Because right turns on Van Ness Avenue would increase (about 50 percent), MUNI buses would be delayed. Increased turns (three indirect turns for every left-turn) and pedestrian conflicts would also occur.

Table 6-1
TRAFFIC IMPACTS OF VAN NESS AVENUE
LEFT-TURN PROHIBITION ON ADJACENT STREETS

Cross Street	Franklin Street		Polk Street	
	Existing	No Lefts	Existing	No Lefts
Pine	0.86 D	0.87 D	0.74 C	0.82 D
Bush	0.86 D	0.88 D	0.72 C	0.82 D
Geary	0.73 C	0.75 C	0.87 D	0.91 E
O'Farrell	0.88 B	0.66 B	0.82 D	0.85 D
Golden Gate	0.51 A	0.54 A	0.77 C	0.79 C

In summary, regional traffic on Van Ness Avenue would benefit form the left-turn prohibition, but pedestrians, MUNI and traffic conditions on Polk, Franklin and Gough Streets would worsen.

Eliminate Pacific Avenue and Union Street Left Turn Phases - A leading left-turn signal phase is provided for the northbound Van Ness Avenue approach at Union Street and a lagging left-turn phase is provided at Pacific Avenue. The leading left-turn phases provide exclusive protected advance signal phases for left-turn movements. Lagging left-turn phases follow green phases for

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through traffic. These exclusive northbound approach left-turn phases also reduce signal green time for southbound Van Ness Avenue traffic.

At Union Street, traffic counts indicate that 60, 90, 100 and 110 VPH make the left-turn from northbound Van Ness Avenue onto westbound Union Street during AM peak, weekday midday, PM peak and typical weekend hours respectively. In general, about 80 VPH left-turns can be accommodated using the yellow signal phase without an exclusive left-turn phase.

At Pacific Avenue, about 30, 40, 60 and 40 VPH make the northbound left-turn during AM, midday, PM and typical weekend hours respectively. The sight distance for this left-turn is somewhat restricted. Left-turn movements at Jackson Street are also low. The Pacific Avenue left-turns could possibly be eliminated and served at Jackson Street.

Allow Post and Sutter Street Left-Turns - Left turns are not permitted from Van Ness Avenue at Post and Sutter Streets. Left-turns, however, are permitted at the adjacent intersections of Pine, Bush, Geary and O'Farrell Streets. These left turns are significant traffic movements and tend to overflow the short half-block turn pockets provided. This in turn blocks a lane of through traffic. On an average weekday, about twice as many left-turns (8,000) are made from southbound Van Ness Avenue onto Bush and O'Farrell Street as are made from northbound Van Ness Avenue onto Pine and Geary Streets. 1993 traffic counts indicate the following hourly left-turn volumes:

	Left-Turn Vehicles Per Hour			
	Pine	Bush	Geary	O'Farrell
AM Peak	45	350	75	160
Midday	100	180	100	160
PM Peak	100	150	120	115
Weekend	65	160	85	120

These volumes suggest that allowing left-turns onto Post Street may reduce left-turn demand at Bush and O'Farrell Streets by dispersing left-turns. This would reduce the probability that left-turns at Bush and O'Farrell Street would overflow their turn lanes. Allowing left-turns onto both Post and Sutter Streets rather than only at Post Street would reduce the length of new left-turn lanes and risk left-turn demand overflow at these intersections.

Left-Turn Overflow Detectors - Exclusive left-turn signal phases are presently fixed into traffic signal programs regardless of demand. Typically, two left-turn movements per traffic signal cycle can be made during the yellow signal phase without left-turn phases even under congested traffic conditions. Longer 90 second signal cycles have 40 cycles per hour and shorter 60 second cycles have 60 cycles per hour. Since 80 to 120 VPH can be accommodated during yellow indications and

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permissive green phases, one strategy would be to actuate exclusive left-turn signal phases only when turn pockets are about to overflow. This would maximize capacity for non-left turn movements, which provide three times the traffic capacity per second of signal green time as the less efficient left-turn phases, and reduce overflow left-turn lane blockages of through traffic lanes. This concept would involve placing loop detectors at the back-end of left-turn pockets and actuating a lead left-turn phase to help clear the left-turn pocket only when a vehicle is detected at the rear of the left-turn pocket.

Widen Northern Median - Northbound traffic on Van Ness Avenue at Lombard Street has a triple left-turn leaving only a single through traffic lane continuing on Van Ness Avenue. This configuration could allow the median north of Lombard Street to be widened from 14 feet to 24 feet and landscaped without affecting traffic capacity on Van Ness Avenue.

Bay Street MUNI Platform - The major right-turn movement from southbound Van Ness Avenue to westbound Bay Street often delays and sometimes blocks southbound MUNI buses, particularly on weekends. One solution to be considered by MUNI would be to reconfigure the block of Van Ness Avenue between North Point Street and Bay Street as follows:

- 16 foot wide sidewalk;
- A northbound MUNI stop/lane;
- Two northbound traffic lanes;
- Four-foot wide raised median;
- Two southbound traffic lanes;
- MUNI stop/lane;
- 12-foot passenger boarding island;
- 17-foot wide right-turn lane; and
- Eight-foot wide sidewalk (reduced from 16 foot present width).

Closing Selected Median Openings - Van Ness Avenue traffic signal progression might be improved by selective closing of several minor street intersection median openings. Signals would still provide for pedestrian crossings, but by eliminating through and left-turn movements for side streets, northbound and southbound signal progressions at minor streets would be independent, allowing for improved traffic signal progression. Candidate closure locations include:

- Francisco Street (bicycle route);
- Filbert Street;
- Pacific Avenue; and
- Washington Street (minor MUNI reroute).

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Pacific Avenue seems like a good pilot intersection to test public acceptance of this concept, although this should be coordinated with the on-going Comprehensive Bicycle Plan which is examining Pacific Avenue as a possible signed commuter bicycle route.

LOMBARD STREET OPERATIONAL IMPROVEMENTS

Lombard Street has 13 signals from Van Ness Avenue to Richardson Street along its 6,200 foot section. The Richardson Street portion, Highway 101 traffic has another three signals between Lombard Street and Lyon Street. While Lombard Street is served by fewer MUNI buses than Van Ness Avenue, it is served by many Golden Gate Transit buses particularly during commute hours in the peak direction. Golden Gate Transit's Civic Center Van Ness Avenue buses are joined by Financial Center buses resulting in peak direction bus volumes of 90 buses per hour.

Physical Features

Lombard Street generally has an 80 foot curb to curb width between Van Ness Avenue and Richardson Street. This cross section provides three narrow 10-foot traffic lanes in each direction, a four foot raised curb median and eight-foot wide parking lanes along each side of the street. Left-turns are prohibited during weekday commute hours, but are allowed at other times. No left-turn signal phases are provided along Lombard Street except at the Lombard/Richardson streets intersection, where a left-turn pocket is provided from westbound Lombard Street to westbound Lombard Street (toward the Presidio). Blocks are spaced about 480 feet apart on Lombard Street.

Traffic Characteristics

Average Daily Traffic (ADT) on the Richardson Avenue/Lombard Street corridor ranges from 38,100 east of Franklin Street to 57,500 west of Divisadero Street. Franklin and Gough Streets are the two major side street traffic tributaries to Lombard Street between Van Ness Avenue and Lyon Street.

The directional flow of traffic on Lombard Street is typical of a major commuter street, with a decidedly eastbound flow during morning peak hours and with a predominantly westbound flow during afternoon peak hours. On weekdays between 8:00 AM and 9:00 AM, the traffic volume directional split on Lombard Street is approximately 74 percent eastbound and 26 percent westbound, with eastbound traffic volumes ranging from 2,500 vehicles per hour (VPH) east of Franklin Street to 3,300 VPH west of Divisadero Street. Between 5:00 PM and 6:00 PM, the directional split is approximately 35 percent eastbound and 65 percent westbound, with westbound

traffic volumes ranging from 1,700 VPH east of Franklin Street to 2,900 VPH west of Divisadero Street. Traffic is heavier in the eastbound direction for both AM and Midday peak periods and in the westbound direction in the PM peak period.

Signalization

Richardson/Lombard signals operate with 90-second cycle lengths for AM, Midday, and PM peak periods. Peak direction of traffic is eastbound in the AM peak hours and midday periods and westbound in the PM peak period. The existing signal timing favors eastbound traffic progression in the AM peak period and westbound traffic in the PM peak period; existing timing provides limited two-way traffic progression for off-peak periods.

Improvement Measures

Due to the limited right-of-way along Lombard Street few operational improvement measures appear to offer merit. The 90 second cycle traffic signal timing scheme appears to be near optimal. Potential improvement measures explored include:

- Extending the left-turn prohibition from the present peak period restriction to cover all time periods;

- Striping Fillmore Street between Chestnut and Lombard Streets to provide an exclusive southbound left-turn lane; and

- Relocating the westbound MUNI stop at Fillmore Street from a shared nearside stop with Golden Gate Transit to an exclusive farside stop.

Left-Turn Prohibition - Midday and off-peak left-turns increase the risk of accidents. The right-of-way is too narrow to provide separate left-turn lanes so left-turns must be made from shared through traffic lanes. Left-turn volumes are not very high and tend to be unexpected by most motorists. As a result, rear-end accidents, sideswipe (lane change) accidents and left-turn accidents occur. A secondary effect of midday left-turns from Lombard Street is that most traffic avoids the left-most lane and tends to concentrate mostly in the center traffic lane. This non-uniform lane distribution lowers traffic service levels. Prohibiting off-peak left turns would slightly increase right-turn movements and delays and would add some right-turn traffic onto Chestnut and Greenwich Streets.

Weekday off-peak and Sunday left-turn hourly volumes along Lombard Street are shown in Table 6-2. To put these hourly volumes in perspective, Lombard Street carries about 1,400 VPH in each

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direction and left-turns account for about one percent of its traffic. In terms of the number of left turns per traffic signal cycle, Lombard Street has 40 signal cycles per hour. Thus, left-turns are an unusual event, and may lead to accidents.

Table 6-2
AVERAGE HOURLY LEFT-TURN VOLUMES
LOMBARD STREET

Side Street	Weekday Off-Peak		Sunday	
	Eastbound	Westbound	Eastbound	Westbound
Broderick	0	0	0	4
Divisadero	21	25	53	23
Scott	8	14	25	14
Pierce	6	8	55	14
Steiner	9	14	9	6
Fillmore	13	15	22	4
Webster	25	9	14	5
Buchanan	15	8	25	4
Laguna	13	8	25	3
Octavia	6	6	9	4
Gough	10	10	10	16
Franklin	7	0	12	0

Fillmore Street Southbound Approach - The northbound approach to Lombard Street has an exclusive left-turn lane and a shared through-right-turn/MUNI bus stop lane. The southbound approach has a single approach lane which tends to increase delays for MUNI Route 22 service, general traffic and regularly stacks traffic back to the Chestnut Street intersection. Weekends tend to be the worst periods. This measure would remove curb parking along one curbface (several meters) and restripe the approach for an exclusive left-turn lane.

MUNI Fillmore Street Stop - MUNI presently shares its westbound nearside bus stop with a large number of Golden Gate Transit buses. This measure would relocate the MUNI stop to a farside stop in order to minimize congestion at the Golden Gate Transit bus stop. One or two parking meter spaces would be lost.

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SIGNAL TIMING OPTIMIZATION

A TRANSYT-7F computer traffic model was built in order to assess the efficiency of current signal timings and to determine optimal timing plans. The TRANSYT 7F model considers conditions at individual intersections as well as interrelated conditions at other nearby intersections. The analysis considered operational constraints on side street signal progression caused by signal timing changes on Van Ness Avenue. Initial timing assessments ignored these cross street constraints and impacts on transit, so that the full Van Ness Avenue benefits could be determined.

TRANSYT-7F Input Data

The TRANSYT-7F model requires three categories of input data:

- Network data, including node and link numbers;
- Signal timing parameters, including cycle lengths, splits, offsets, pedestrian clearance times, and phasing sequences; and
- Geometric and traffic data, including link lengths, saturation flow rates, start-up lost times, green extension times, average cruise speeds, and traffic volumes.

Signal timing parameters were based on existing signal timing plans provided by the Department of Parking and Traffic. Link lengths, intersection spacings, lane configurations, turning lane storage lengths, and lane widths were determined based on existing striping plans provided by the Department of Parking and Traffic. Posted speed limits were used for average cruise speeds. Traffic volumes were based on turning movement counts collected in February 1994.

Field surveys were conducted to measure saturation flow rates, start-up lost times, and green extensions during the AM peak period. The AM peak period was selected for traffic surveys since traffic volumes in the Lombard Street/Van Ness Avenue Corridor are highest in the AM peak period. These results were then compared to saturation flow rates that can be generated using procedures described in the Highway Capacity Manual (HCM) to see if HCM procedures would provide accurate data.

Field technicians used stopwatches to record the beginning of green phases and arrival times of the first, fourth, and tenth vehicles of traffic queues as these vehicles crossed the intersection stop bar with their rear axles. Surveys were performed for six consecutive cycles at each location. Start-up lost time is the time the first vehicle in a queue takes to cross the stop line with its rear axle after the beginning of green phase. Green extension is the time between the beginning of yellow time and

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the time that the last arriving vehicle crosses the stop bar. The average start-up lost time and green extension, respectively, were 2.4 seconds and 3.0 seconds.

Queue discharge headways and saturation flow rates are determined as follows:

Queue discharge headway = (Crossing time of tenth vehicle - Crossing time of fourth vehicle) ÷ (10 - 4)

Saturation flow rate = 3,600 ÷ Queue discharge headway.

Saturation flow rates were measured for through, left-turn, right-turn, and shared right-turn lanes. Saturation flow rates ranged from 1,172 to 1,587 vehicles per hour per lane (vphpl) depending on the movements allowed for each lane.

The Arterial Analysis Package (AAP) computer software was used to estimate saturation flow rates at the sampled intersections for comparison to field data. AAP is capable of determining saturation flow rates based on the HCM methodology by applying adjustment factors for lane widths, number of buses, number of parking maneuvers, and right-turn and left-turn volume proportions to an ideal saturation flow rate of 1,800 vphpl. The following assumptions were made:

- Non-CBD area
- Number of parking maneuvers/hour = 20, where parking is permitted
- Truck percentage = 3.8% (based on 1992 counts by Caltrans)
- Peak Hour Factor = 1.0
- Number of buses/hour = Actual bus volumes based on current bus schedules from MUNI and Golden Gate Transit Districts (see Table 3)
- Left-turn sneakers per phase = 2.0
- Study period length = 60 minutes
- Pedestrian level = Low for System 6 intersections (Lombard and Van Ness north of Clay) and Moderate for System 3 intersections (Van Ness south of Clay).

HCM saturation flow rates were within one and seven percent of saturation flow rates measured in the field. HCM saturation flow rates were therefore used in simulation runs.

TRANSYT-7F default values were used for the platoon dispersion factor, fuel consumption estimate factor, average vehicle spacing, desired degree of saturation, threshold of degree of saturation to recommend double cycling, weighting factor for excess maximum back of queue, inflation rate, cost of fuel per gallon, and average vehicle occupancy.

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TRANSYT-7F Calibration Runs

Simulation runs were calibrated to reflect existing conditions since calibration runs serve as a starting point for the optimization process and as a baseline for comparison of existing simulation and final optimization runs. Travel time was used to calibrate simulation runs since existing data were readily available from travel time surveys. The AM peak period was selected for calibration since traffic volumes are highest in the Lombard/Van Ness Corridor during this peak period.

Table 6-3 summarizes the system-wide measures of effectiveness (MOE's) for all three peak periods in Systems 3 and 6. Signal system 3 generally encompasses intersections bounded by California, Leavenworth, Market and Webster Streets. Signal system 6 includes Lombard/Richardson Street signals and Van Ness Avenue signals between Bay and Sacramento Street. For both systems the PM peak traffic experiences the worst MOE's, followed by the AM peak, then the midday peak traffic. Several queue spillbacks and over-saturated links were detected during both the AM and PM peak periods.

Table 6-3
SUMMARY OF SYSTEM-WIDE MEASURES OF EFFECTIVENESS

Performance Measure	Units	System 6 MOE's			System 3 MOE's		
		AM	Midday	AM	AM	Midday	PM
Total Travel	veh-mi/hr	7,359	5,234	7,529	4,989	4,057	6,542
Total Travel Time	veh-hr/hr	788	327	1715	542	341	636
Total Delay	veh-hr/hr	530	144	1,452	341	151	379
Average Delay	sec/veh	19.0	7.4	50.7	15.2	8.2	12.4
Stops	%	33	29	33	50	41	53
Speed	mph	9.3	16.0	4.4	9.2	13.0	10.3
Fuel Consumption	gal/hr	885	437	1558	631	398	802
Operating Cost	$/hr	4,829	2,629	7,119	3,531	2,355	4,700

The most severe traffic conditions were found on signal system 6 which, during the PM peak hour, had an average speed of only 4.4 MPH.

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Five MOE's were employed to evaluate alternative signal timing plans:

- Average travel speed.

- Disutility Index (DI) which, because it describes the amount of delay and number of vehicle stops, high numbers indicate poor performance.

- Progression opportunities (PROS) which assign a factor of one if vehicles can progress through two adjacent signal, a factor of two for three adjacent signals, etc.

- Performance Index which is simply PROS divided by DI (higher numbers are best).

- Progression bandwidth which for an optimum speed describes the number of seconds of signal green time the progression exists.

Signal System 3 - Van Ness Avenue South of Washington Street

Analysis of optimal signal timings along the southern portion of Van Ness Avenue considered:

1. Changing the length of the present 60-second cycle.

2. Changing off-sets; and

3. Changing the proportion of green time allocated to different signal phases of individual intersections.

Because signal progression on cross streets are set at 60 seconds, shifting to a longer cycle length for Van Ness Avenue signals is not recommended. The optimal cycle lengths for Van Ness Avenue were determined to be 71 seconds for the AM peak, 89 seconds for midday periods and 77 seconds for the PM peak. These cycle lengths would generally increase average speeds along Van Ness Avenue by 1.2 MPH (11 percent) during the AM peak; no change midday; and 2.7 MPH (20 percent) during the PM peak. Cross Street traffic on Pine, Bush, Post, Sutter, Geary, O'Farrell Streets and other streets would encounter increased delays.

Reallocation of signal green time at individual intersections is limited by requirements to provide for pedestrian crossing time (minimum 20 seconds).

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Optimization of off-sets with retention of the current 60-second cycle length yielded the following benefits:

		Existing	Percent Benefit
AM PEAK			
Average Speed		11.2	zero
Disutility Index		330.3	2.4
Performance Index		0.042	33.8
PROS:	Southbound	35	zero
	Northbound	9	-11.1
Bandwidth:	Southbound	13	23.1
	Northbound	zero	zero
MIDDAY			
Average Speed		13.0	13.5
Disutility Index		214	5.1
Performance Index		0.0713	47.0
PROS:	Southbound	15/14	33/43
	Northbound	21/21	14/43
Bandwidth:	Southbound	0/0	N/A
	Northbound	0/0	N/A
PM PEAK			
Average Speed		10.3	10.7
Disutility Index		506.1	13.6
PROS:	Southbound	14	-66.3
	Northbound	30	+46.7
Bandwidth:	Southbound	2	zero
	Northbound	14	43

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System 6 - Lombard Street and North Van Ness Avenue

System 6 operates on a 90 second signal cycle length, but similar to System 3, it has minimum pedestrian crossing times of 20 seconds. Pedestrian traffic is significant during most time periods and therefore pedestrian actuated side street extension times would not likely allow significant reallocation of green time to Lombard Street and Van Ness Avenue signal phases. In general, pedestrian actuated signal phases favor vehicle traffic over pedestrian traffic which is not consistent with City policy.

Analysis of the optimum signal cycle lengths determined that 103 seconds would be best for the AM peak, 109 seconds for the midday and PM peak periods using present off-sets and splits. Optimizing for all features, however, indicates that the present 90-second cycle should be retained and only off-sets and splits changed.

For Lombard Street improved signal timings are forecast to improve average travel speeds nine percent during the AM peak, six percent midday and eight percent during the PM peak. Progression opportunities would not increase significantly for the AM peak, but to improve during the midday and PM peak periods.

For Van Ness Avenue, average travel speeds are forecast to improve nine percent during the AM peak, twenty percent midday and 21 percent during the PM peak period.

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7. CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the recommendations of the consultant team regarding the major issues of this study. These recommendations will be reviewed by the City, the Project Task Force, Caltrans and then presented to various City agencies so that a formal recommendation on how to proceed can be made to Caltrans.

The primary issues requiring resolution in this study are addressed in this chapter as follows:

1. Should Caltrans proceed with seismic retrofit of the current double-deck Central Freeway structure over Market Street?

2. If it is decided to retrofit, what street and highway improvements should be made to make the system operate more efficiently and safely?

3. If the retrofit is not recommended, what alternative or alternatives should be considered?

4. What steps should be taken to reach and implement the best solution as quickly as possible?

Should Caltrans Proceed with Retrofit of the Existing Structure?

Retrofitting the existing structure has two primary advantages:

1. It could be accomplished in the least possible time, giving the travelling public a seismically safer structure sooner than any of the other options because it is funded, might not require an environmental impact statement, and its design is almost complete.

2. Most peak period traffic could probably be maintained during construction, thereby avoiding major traffic congestion problems during the construction period.

However, the retrofit also has some major disadvantages:

1. It perpetuates a structure that was designed as part of a much more extensive freeway system and consequently is overbuilt and is much higher than it needs to be. In essence, the current design is not reflective of or sensitive to its urban setting and low speed function of freeway terminal access ramps.

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2. The pre-Loma Prieta section directed traffic via both north-south and east-west corridors, thereby pointing traffic in the direction it wanted to go. The current truncated section directs all traffic east-west, thereby increasing traffic on Oak and Fell Streets to unnecessarily high levels.

3. One main reason to retrofit, the ability to maintain traffic continuously, is a mixed blessing. It makes the construction process very complex and puts a high degree of responsibility on Caltrans to maintain safety during construction.

4. The present structure is has a blighting impact on adjacent neighborhoods and blocks views. The retrofit concept retains this unattractive structure.

5. A new structural design developed from recent earthquake experience would almost certainly be safer than a "patched" design.

In short, the retrofit retains an unattractive structure with unsatisfactory local traffic connections, and puts a heavy burden on Caltrans to maintain traffic safely during construction. Its retention ensures that the currently unsatisfactory urban environment in the vicinity of the structure will be perpetuated. These are significant arguments against the retrofit project and there appear to be viable alternatives. As such, it is recommended that the City and Caltrans pursue non-retrofit alternatives in order to define a community supportable project[1]. If a consensus plan cannot be found, then retrofit plans should be reconsidered.

Traffic Changes if the Retrofit Proceeds

As noted above, the retrofit is not recommended. However, if no other solution can be supported, traffic changes to the current Fell-Oak ramps documented in this report should be further explored to improve traffic flow in the area.

Alternatives to the Retrofit

It is virtually certain that any alternative to the retrofit will have to go through an extensive environmental process which would involve consideration of a number of alternatives. Therefore, it is not necessary to choose a particular alternative at this time. However, based on the analyses

[1]The current study did not review or study structural aspects of the existing structure. However, if it appears that a lengthy period prior to reconstruction will take place, Caltrans may want to consider further structural improvements in the interim to the elevated structure.

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of this study, it may be possible to further focus planning on alternatives that should be considered. The following is recommended:

1. **Alternatives should concentrate on those that rebuild the freeway on a single deck crossing of Market Street.** Alternatives that do not rebuild the freeway back north of Market Street will lead to congestion crossing and along Market Street, thereby hampering mobility of both automobiles and transit vehicles. However, at least one alternative terminating the freeway south of Market Street should be examined.

2. **Alternatives should provide good traffic flow onto the Franklin/Gough/Van Ness corridor.** Traffic wishing to go to and from the north should not be routed via the Oak and Fell couplet. Rather, it should be routed via new ramps and street configurations in the least circuitous and disruptive way toward the major north-south streets in the corridor.

3. **Tunnel alternatives probably could be eliminated with minor effort.** The presence of the MUNI tunnel does not allow for enough clearance to permit a shallow tunnel on any of the streets crossing Market. A deep tunnel would be expensive, have unsatisfactory geometry and would not come to surface far enough south to provide the required traffic service.

Steps Required to Reach a Consensus

The following general process is recommended so that a project having the widest support can be defined, funded and constructed as soon as possible:

1. The City should recommend to Caltrans that the current freeway retrofit design process be put in abeyance at this time and that other options be studied.

2. A detailed study of alternatives should be initiated as soon as possible. This could occur through either the Caltrans Project Study Report (PSR) process or go directly to a full environmental impact statement. Whatever the process, it is critical that the study be much more than a traffic and engineering study and that all issues critical for selection of a preferred alternative be analyzed in detail, with major emphasis on:

   a. **Roadway Aesthetics:** The selected alternative should provide a significant improvement over the current double-deck structure as viewed from a variety of angles.

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b. Neighborhood Impacts: The selected alternative should provide significant improvement to the neighborhoods impacted in terms of pedestrian safety, noise, land use integration and other aspects that make a neighborhood more livable.

c. Traffic Flow: Traffic should be routed as efficiently and directly as possible without significant traffic increases on residential streets. System design should explore the full range of Intelligent Vehicle Highway Systems (IVHS), operational and physical concepts to minimize spillover impacts on local city streets and the James Lick Freeway.

d. Traffic During Construction: Traffic should be manageable during what could be a lengthy construction period. Methods for managing traffic and impacts on nearby residents and business during the construction period should be developed and the potential disruption and mitigation cost should be included in evaluating the alternative.

e. Land Use and Development: The amount of land available or required to be taken and the potential for development under each development scenario needs to be evaluated. This work must be done in close coordination with the Planning Department.

f. Transit Impacts: The impact on MUNI service should be carefully evaluated, with construction period service impacts considered as well as long range service impacts.

g. Safety: Traffic safety on the freeway and on City Streets should be evaluated in terms of both vehicular and pedestrian safety.

3. The above study should have active community participation, with the Hayes Valley/Western Addition Task Force as the primary participant. Expansion of the current Task Force to include more representation from various city neighborhoods is recommended and has been endorsed by the Task Force.

Interim and Supportive Traffic Improvements

As described in Chapters 5 and 6, a number of traffic operations and complementary freeway circulation options appear to offer some improvement to existing traffic conditions and merit further technical studies and broader public review.

These options include:

Freeway Access Grade Separations

- Construct a southbound South Van Ness Avenue underpass of Mission Street;
- Add a third lane to the Mission Street off-ramp;

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- Depress Thirteenth Street under South Van Ness Avenue; and
- Construct an Eighth Street off-ramp flyover of Harrison Street.

Freeway Access Operational Measures

- Extend the Howard/Folsom Street one-way couplet south to Fourteenth Street;
- Add a second lane to the South Van Ness Avenue/Mission Street on-ramp;
- Extend Franklin Street to Otis Street;
- Physically separate South Van Ness Avenue on-ramp traffic flow from westbound Howard Street traffic flow at the South Van Ness/Howard/Thirteenth Street intersection; and
- Close McCoppin Street at the Otis/Gough Street intersection and signalize the remaining Otis and Gough approaches.

Minor Improvement Measures

- Upgrade traffic, parking, loading controls as well as informational signage and signalization along freeway access routes;
- Add eastbound right-turn lane on Thirteenth Street for eastbound approach to South Van Ness Avenue;
- Modify left-turn provisions on Thirteenth Street;
- Add right- and left-turn lanes on South Van Ness Avenue southbound approach to Mission Street; and
- Explore urban design and landscaping improvement beneath the present structure.

Public Transit

- Fully fund MUNI service;
- Dispatch Route 47 buses to fill in gaps for MUNI Van Ness Avenue service;
- Develop Construction Period bus/HOV lane plan; and
- Study Nineteenth Avenue corridor regional bus service.

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BOARD OF SUPERVISORS

RESOLUTIONS

APA/S135A

File 171-92-3

ERRATA

Correct Resolution 541-92, page three, line 6, by deleting "serve, also, on" and inserting "advise" so the sentence shall read: The mayor is urged to appoint interdepartmental representatives to advise this task force.

John L. Taylor
Clerk of the Board
September 11, 1992

As amended in Committee 6/9/92
As amended in Board 6/29/92
As amended in Board 7/6/92

FILE NO. 171-92-3 RESOLUTION NO. 541-92

[CENTRAL FREEWAY]

DECLARING IT TO BE THE POLICY OF THE CITY AND COUNTY OF SAN FRANCISCO NOT TO BUILD ANY NEW ABOVE-GROUND RAMPS TO REPLACE THE DEMOLISHED SECTIONS OF THE CENTRAL FREEWAY; REQUESTING AN EXPEDITIOUS RESOLUTION OF FUNDING FOR SURFACE-LEVEL TRANSPORTATION IMPROVEMENTS; CREATING A TASK FORCE TO PLAN LAND USE AND TRANSPORTATION NEEDS FOR THE HAYES VALLEY AND WESTERN ADDITION NEIGHBORHOODS; REQUESTING THE CALIFORNIA DEPARTMENT OF TRANSPORTATION TO UNDERTAKE A FEASIBILITY STUDY TO UPGRADE THE SOUTH VAN NESS INTERCHANGE, AND TO CONSIDER THE SAN FRANCISCO TOMORROW PLAN.

WHEREAS, Board of Supervisors Resolution No. 796-90 urges the California Department of Transportation (Caltrans) to demolish the damaged portions of the Central Freeway viaduct of Highway 101 and Board of Supervisors Resolution No. 382-92 urges the removal of the demolished Central Freeway from the State Highway system; and

WHEREAS, Caltrans has completed its demolition of the Central Freeway; and

WHEREAS, The demolition of the Central Freeway has contributed to the revitalization of the Western Addition and Hayes Valley neighborhoods, and has made approximately six city blocks available that previously lay underneath the freeway; and

WHEREAS, Senate Bill 181 (Kopp) mandates that Caltrans, in consultation with the City and County of San Francisco, shall identify reasonable and practical alternatives to repairing or replacing the damaged portions of Route 101 and shall hold at least

two public meetings in the development of the alternatives; and

WHEREAS, The first public meeting was held on May 5, 1992 at the John Swett Elementary School and was attended by over 400 people; and

WHEREAS, Of the three plans submitted by the Department of City Planning and Caltrans, and the alternate plans submitted by San Francisco Tomorrow, a majority of those in attendance expressed support for the "no new ramps" alternative; and

WHEREAS, SB 181 mandates that the selected alternative must be approved by a resolution of the City and County; now, therefore, be it

RESOLVED, That the Board of Supervisors, of the City and County of San Francisco does declare it to be the policy of the City and County not to build any new above-ground ramps north of Fell Street to replace the demolished sections of the Central Freeway; and be it

FURTHER RESOLVED, That the Board of Supervisors of the City and County of San Francisco requests the Mayor, Caltrans and the U.S. Department of Transportation to arrive at an expeditious resolution of funding better surface-level traffic and transit improvements on the Highway 101 corridor; and be it

FURTHER RESOLVED, That the Board of Supervisors urges the Mayor to immediately convene a task force to plan for the land use and transportation improvements for the Hayes Valley and Western Addition neighborhoods, in consultation with the residents and

BOARD OF SUPERVISORS

merchants of those areas and the development community. The membership of the task force shall include 11 community members who are residents of the Hayes Valley and Western Addition neighborhoods, who shall be appointed by the Board of Supervisors. The Mayor is urged to appoint interdepartmental representatives to advise ~~serve, also, on~~ this task force; and be it

9/11/92
jcl

FURTHER RESOLVED, That improvements to traffic flow along the US101/Van Ness corridor can be improved through upgrades to the South Van Ness interchange and the City and County of San Francisco requests the Caltrans to undertake a feasibility study of such interchange improvements in that area, and to consider, among other alternatives for traffic improvements that may be considered, the San Francisco Tomorrow Plan which appears in Board File No. 171-92-3.

Adopted - Board of Supervisors, San Francisco July 6, 1992

Ayes: Supervisors Achtenberg Britt Conroy Gonzalez Hallinan Hsieh Maher Migden Shelley

Absent: Supervisors Alioto Kennedy

I hereby certify that the foregoing resolution was adopted by the Board of Supervisors of the City and County of San Francisco

John Taylor
Clerk

File No.
171-92-3

JUL 10 1992
Date Approved

Frank M. Jordan
Mayor

FILE NO. 85-93-2 RESOLUTION NO. 9-94

Amendment of the Whole
1/3/94

[San Francisco Central Freeway]

REQUESTING THAT THE MAYOR URGE CALTRANS TO AWAIT THE COMPLETION OF THE DEPARTMENT OF PARKING AND TRAFFIC'S CENTRAL FREEWAY AREAWIDE TRAFFIC STUDY WITH SPECIFIC GUIDANCE FROM THE DEPARTMENT OF PLANNING'S REVISED CIVIC CENTER MASTER PLAN BEFORE BEGINNING THE PROCESS FOR RETROFIT OF THE CENTRAL FREEWAY AND URGING THE MAYOR TO REPORT TO THE BOARD OF SUPERVISORS WITHIN THIRTY DAYS A WORK PLAN AND TIME-TABLE TO ADEQUATELY UNDERTAKE THE STUDY OF ALTERNATIVES AND FINDINGS AND TO REPORT ON THE PROGRESS OF THE STUDIES IN ACCORDANCE WITH BOARD RESOLUTION 541-92.

WHEREAS, Board of Supervisors Resolution 541-92 urges the Mayor, Caltrans, and the U.S. Department of Transportation to arrive at an expeditious resolution of funding better surface-level traffic and transit improvements on the Highway 101 corridor; urges the Mayor to appoint a task force to plan for the land use and transportation improvement in the Hayes Valley and Western Addition neighborhoods in consultation with residents and merchants of the area; and urges Caltrans to undertake a feasability study of various alternative traffic improvements in the Highway 101 corridor, including the San Francisco Tomorow Plan; and

WHEREAS, the San Francisco Department of Parking and Traffic proposes to start the Central Freeway Traffic Study called for in the Board of Supervisors Resolution No. 541-92 in December, 1993; and

Supervisors Hallinan, Bierman, Shelley, Leal

WHEREAS, Caltrans is planning to begin the bidding process for retrofit of the existing Central Freeway in April, 1994 and construction in July, 1994, before completion of the Department of Parking and Traffic's Central Freeway Areawide Traffic and Land Use Study; and

WHEREAS, Caltrans has not disclosed to the public, the City and the Board of Supervisors its proposals for the retrofit of the Central Freeway; and

WHEREAS, the San Francisco Department of City Planning is in the process of greatly revising binding Master Plan policies for the Civic Center which includes the areas of the Hayes Valley and the Central Freeway; and

WHEREAS, the Board of Supervisors have recommended to the Mayor area representatives to the task force called for in Resolution 541-92; and

WHEREAS, the Mayor has not yet convened the interdepartmental task force, including representatives of the Department of City Planning, citizens and San Francisco Tomorrow called for in Resolution 541-92; and

WHEREAS, precedent has been set by Caltrans which has agreed to await the City's input before it makes improvements to the Terminal Separator and the U.S. Department of Transportation has agreed that federal emergency funds will be available for that project; now, therefore, be it

RESOLVED, That the Board of Supervisors of the City and County of San Francisco request that the Mayor urge Caltrans await completion of the Department of Parking and Traffic's Central Freeway Areawide Traffic and Land Use Study with specilc guidance from Department of Planning's revised Civic Center Master Plan, the Citizens' Advisory Committee and the City and County before initiating the bidding process for retrofit of the Central Freeway; and, be it

Supervisors Hallinan, Bierman, Shelley, Leal

FURTHER RESOLVED, That the Board of Supervisors urges the Mayor to report to the Board of Supervisors within thirty days a work plan and time-table to adequately undertake the study of alternatives and findings, and thereafter, to report on the progress of the above studies until the Board of Supervisors deem that their requests have been met in accord with Board Resolution 541-92.

Supervisors Hallinan, Bierman , Shelley, Leal

BOARD OF SUPERVISORS

Adopted - Board of Supervisors, San Francisco January 3, 1994

Ayes: Supervisors Alioto Bierman Conroy Hallinan Hsieh Kennedy Leal Maher Migden Shelley

Absent: Supervisor Kaufman

I hereby certify that the foregoing resolution was adopted by the Board of Supervisors of the City and County of San Francisco

John Taylor

Clerk

File No. 85-93-2

JAN 1 4 1994

Date Approved

Frank M. Jordan

Mayor

APPENDIX B

HAYES VALLEY/WESTERN ADDITION TASK FORCE MEMBERS
(as of July 1994)

Wayne Corn, Chair

Ian Ayers, South of Market
Kate Carroll, American Institute of Architects*
Bernard Choden, San Francisco Tomorrow
Lynn Creighton
Robert Czekala
Craig Etlin
Lisa Foster
Mary Beth Frederick
Tom Girardot
Ephriam Hirsch, San Francisco Beautiful
Leland Meyerzone, South of Market
Russell Pritchard
Cecilia Shepard
Edward Spivak
Nancy Zimmer

* Replaces Mary Austern, former AIA representative.

AP-B/S135A

CENTRAL FREEWAY AREAWIDE TRAFFIC STUDY
TECHNICAL ADVISORY COMMITTEE

Jerry Robbins, Chair
Department of Parking and Traffic

Lisbet Engberg
Department of Parking and Traffic

José Luis Moscovich
San Francisco County Transportation Authority

Carl Natvig
San Francisco Municipal Railway

Jim Regan
Caltrans

Stuart Sunshine
Mayors Office

John Thomas
Department of Public Works

Bill Wycko
Department of City Planning

Peter Albert
Department of City Planning

AP-C/S135A

APPENDIX D

ORIGIN-DESTINATION SURVEY DESCRIPTION

A mail-back postcard survey of motorists was conducted from January 11th to the 13th at the following off-ramps: the Eighth/Harrison I-80 westbound off-ramp, the Mission/South Van Ness U.S. 101 northbound off-ramp, and the Fell/Laguna Central Freeway off-ramp. Surveyors handed survey cards to drivers stopped at the traffic signals at the end of each freeway ramp. Surveyors had to walk onto the on-ramps to reach drivers in each traffic lane. The information accumulated in this survey was used to help evaluate the benefits of the various alternatives. Figure A shows the survey postcard.

At each of these ramps an approximately equal amount of surveys were distributed during the midday (11:00 AM to 2:00 PM) and the AM (7:00 to 9:00 AM) and PM (3:30 to 5:30 PM) peak periods. The survey had to be stopped at about 5:30 PM each day as it became dark and the safety of the surveyors handing out survey cards on the freeway off-ramps became an increasing concern. Of the approximately 8,500 total surveys handed out at all three ramps, 1,979 usable surveys were returned (a 23 percent response rate). By comparing the volume of traffic that used each ramp during the survey to the number of surveys returned, the percent of traffic surveyed was determined to be 7 percent. Information about the survey sample and the response characteristics is summarized in Table D-1.

Table D-1
SURVEY SAMPLE AND RESPONSE CHARACTERISTICS
Page 1 of 2

		Eighth	Mission	Fell	Total
Surveys Distributed:	AM	900	900	1000	2800
	Midday	1100	1000	1000	3200
	PM	600	900	1000	2500
	TOTAL	**2800**	**2800**	**3100**	**8500**
Surveys Returned:	AM	250	189	201	640
	Midday	337	251	236	824
	PM	92	166	257	515
	TOTAL	**679**	**606**	**694**	**1979**

APP/S135A

Table D-1
SURVEY SAMPLE AND RESPONSE CHARACTERISTICS
Page 2 of 2

		Eighth	Mission	Fell	Total
Response Rate:	AM	28%	20%	20%	23%
	Midday	31%	25%	21%	26%
	PM	15%	18%	26%	21%
	TOTAL	**26%**	**22%**	**22%**	**23%**
Percent of Traffic:	AM	11%	10%	8%	10%
	Midday	11%	7%	3%	6%
	PM	6%	7%	5%	6%
	TOTAL	**10%**	**7%**	**5%**	**7%**

The survey ended at 5:30 PM when it became dark and no longer safe for surveyors to walk amid traffic exiting the freeway. For this reason Golden Gate Bridge and Richmond District traffic may not have been fully represented in this survey. Overall, a good response was received on this survey. Many motorists took the time to provide detailed comments in addition to responding to basic questions. The data and comments compiled from this survey provide valuable insight into the characteristics of Central Freeway motorists and their travel patterns.

APP/S135A

CENTRAL FREEWAY AREAWIDE TRAFFIC STUDY

The City of San Francisco is conducting a study of traffic and circulation patterns, and considering possible roadway and traffic improvements. Please complete this form and **drop it in any mail box.** Your assistance will be very helpful in determining potential ways to improve traffic conditions. Thank you for your time.

1. Where are you coming from?
   - ☐ Bay Bridge/East Bay
   - ☐ South Bay/Peninsula
   - ☐ Downtown San Francisco
   - ☐ Other S.F. Neighborhood - Please Specify ____________________
   - ☐ Other - Please Specify ____________________

2. Are you going to a location in San Francisco? If so, please specify the District if you know it and the nearest street intersection.

   SF District (i.e. Richmond District) ____________________

   Nearest Intersection (i.e. 27th Ave. and Geary Blvd.) ____________________

3. If you are not going to a location in San Francisco, what city, town, or community are you headed for? (i.e. Sausalito) ____________________

4. Number of persons in vehicle? __________

5. What type of vehicle?
   - ☐ Passenger vehicle (Auto/Van/Motorcycle)
   - ☐ Two axle commercial truck
   - ☐ Three or more axle commercial truck
   - ☐ Other - Please Specify ____________________

6. Are you a resident of San Francisco? ☐ Yes ☐ No

Si necesita ayuda para llenar ésta encuesta puede llamar al teléfono

需要中文翻譯幫助請電

1-415-979-5930

Other comments and suggestions to improve traffic in San Francisco are welcome. ____________________

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